P/014/61/040/001/001/007
A221/A126

AUTHOR: Drela, Henryk

TITLE: Recovery of phthalic acid anhydride from distillation tailings

PERIODICAL: Przemysł Chemiczny, v. 40, no. 1, 1961, 6-8

TEXT: During catalytic oxidation of naphthalene into phthalic acid, anhydride, several bi-products like naphthoquinone, benzoic acid, maleic acid anhydride, etc. are formed as well. These impurities condense together with the main product and are found in the crude phthalic acid anhydride in quantities of 3-8% by weight. Phthalic acid anhydride is chemically refined and subsequently distilled under reduced pressure. At the beginning, the distillation progresses rather fast, but in order to extract the last 35-40% of same from the distillation tailings, expensive special processes have to be applied. Because of this, the heavy tailings are often wasted or burnt as fuel. The author describes in this article the semi-technical installation developed at the Zakłady Azotowe (Nitrogen Products Plant) in Kędzierzyn, in which complete recovery of phthalic acid anhydride from distillation tailings can be achieved. Crude, molten phthalic acid anhydride is treated in a mixer with 94-96% sulphuric acid at a ratio of

Card 1/5

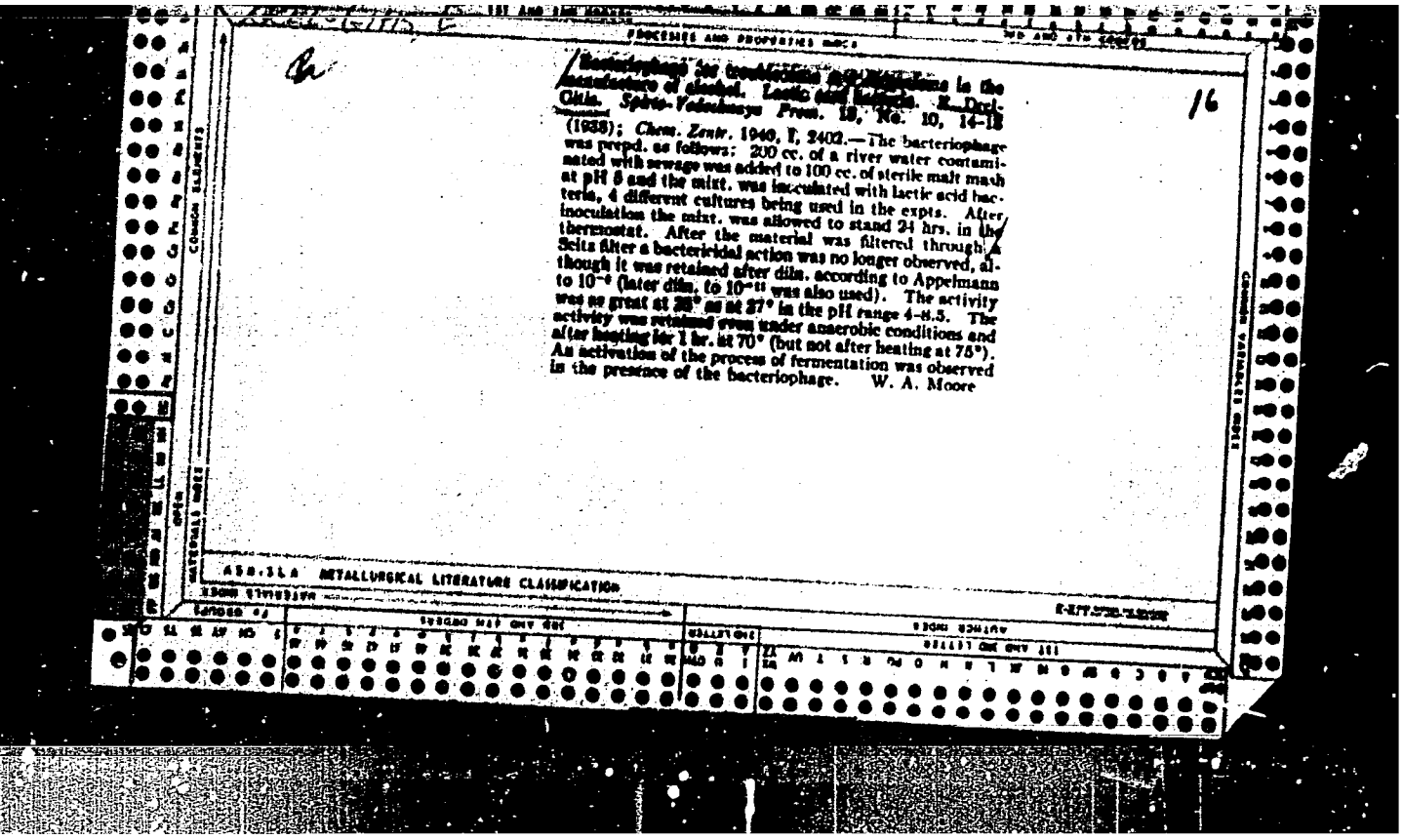
Recovery of phthalic acid ...

5 kg per ton of anhydride at 200°C and then the temperature is raised for four hours to 240°C and cooled down again. As soon as the temperature drops to 220°C, a suitable quantity of ground chalk is added. Refined phthalic acid anhydride is then transferred by suction into the distillation apparatus. The distillation is carried out at 60 mm Hg pressure and 190-215°C, until approximately 92% of phthalic acid anhydride is driven off. The thick residue (tailings) still contains 35-40% of anhydride. This mass is transferred into another distilling vessel fitted with a strong stirrer and heated with flue gases to 250-270°C, and the distillation is carried out at 60 mm Hg pressure. Driven off anhydride vapors pass the distillation column packed with aluminum rings, cool down to 145-150°C in a cooler filled with boiling ethylbenzene and condense; ethylbenzene vapors condence in reflux coolers. Liquid phthalic acid anhydride flows from the separator through a barometric stand pipe into a receiver and the drum-crystallizer where it solidifies. Anhydride vapors, carried out of the separator by air, condense in a catch pot, while the air is washed in a scrubber. The residue in the distilling vessel has the form of a dry loose powder consisting of $CaSO_4$ and $CaCO_3$ and is practically free of phthalic acid anhydride. It was observed that distillation temperature increases gradually as the process is progressing and the stuff in the distillation vessel thickens, causing rapid increase of power consumption by the stirrer motor. After a while, however, power consumption returns to normal

Recovery of phthalic acid ...

which indicates the end of the process. The final product consists of 98.8% of phthalic acid anhydride, 0.90% phthalic acid, less than 0.06% maleic acid anhydride and 0.098% naphthoquinone. Melting temperature of the product is 130.8°C. Lack of information on how much power is needed for keeping the stirrer in commission and on the temperature required for completing the process were the main snags in designing the installation. For carrying out the process satisfactorily the following temperatures and pressures had to be maintained: Flue gas inlet temperature (T_1) - 600-650°C; flue gas exit temperature (T_2) - 500-540°C; temperature inside the distillation vessel (T_3) - 250-310°C; temperature at the bottom of the distillation column (T_4) - 220°C; temperature on top of the column (T_5) - 190°C; temperature after the cooler (T_6) - 145-150°C; temperature in the receiver (T_7) - 150°C; pressure in the distilling vessel (p_1) - 80 mm Hg; pressure in the catch-pot (p_2) - 60 mm Hg. Because small quantities of phthalic acid anhydride in contact with air might ignite spontaneously, it is advisable to break the vacuum by filling the installation with CO_2 or nitrogen. On the basis of the experience gained, an industrial installation will be designed. There are 3 figures and 2 non-Soviet-bloc references.

ASSOCIATION: Zakłady Azotowe, Kędzierzyn (Nitrogen Products Plant) in Kędzierzyn.



Bacteriophage [illegible] in the manufacture of alcohol. Lactic acid bacteria. E. Dick. Gikla. Spirto-Vedeniaya Prom. 18, No. 10, 14-18 (1938); *Chem. Zentr.* 1940, I, 2402.—The bacteriophage was prepd. as follows: 200 cc. of a river water contaminated with sewage was added to 100 cc. of sterile malt mash at pH 5 and the mixt. was inoculated with lactic acid bacteria, 4 different cultures being used in the expts. After inoculation the mixt. was allowed to stand 24 hrs. in the thermostat. After the material was filtered through a Seitz filter a bactericidal action was no longer observed, although it was retained after diln. according to Appelmann to 10^{-8} (later dilns. to 10^{-11} was also used). The activity was as great at 28° as at 27° in the pH range 4–8.5. The activity was retained even under anaerobic conditions and after heating for 1 hr. at 70° (but not after heating at 75°). An activation of the process of fermentation was observed in the presence of the bacteriophage. W. A. Moore

16

A50-3 LA METALLURGICAL LITERATURE CLASSIFICATION

DREL'-GITIS, Ye.V.

DREL'-GITIS, Ye.V.

Some features of the dynamics of immunological reactions in experimental tuberculosis. Zhur.mikrobiol.epid. i immun., supplement for 1956:2-3 '57 (MIRA 11:3)

1. Iz L'vovskogo instituta tuberkuleza.
(TUBERCULOSIS) (IMMUNITY)

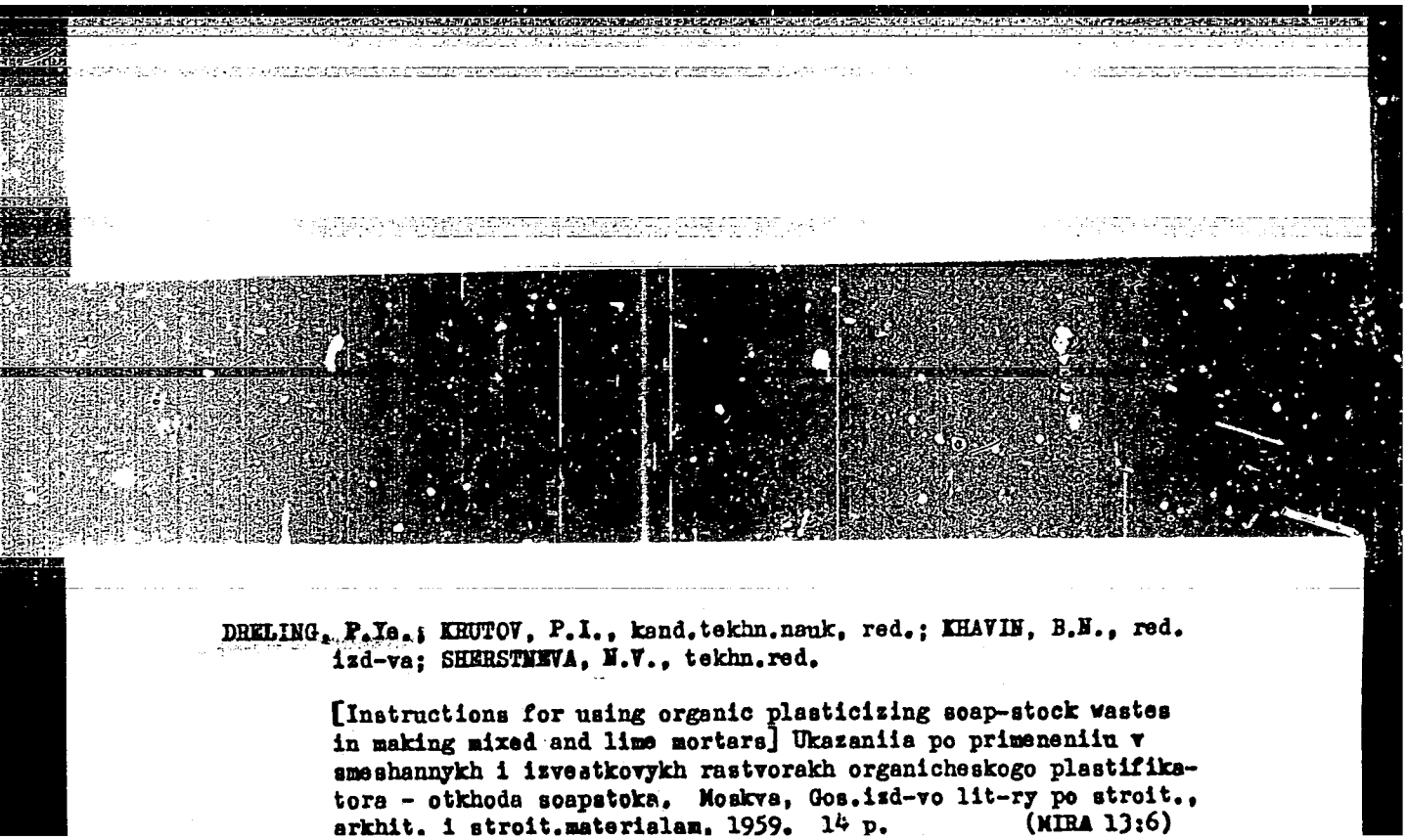
IRELING, P.Ye.

Industrial waste products became new building materials. Izobr. v SSS . 1 no.4:10-12 O '56. (MIRA 10:3)
(Waste products) (Building materials)

[redacted]

Soap stock waste as a new plasticizer. Biul. stroi. tekh. 13 no.9:12-14 S '56. (MLRA 9:11)

1. Nauchno-issledovatel'skiy institut Gorsel'stroy.
(Soap) (Mortar)



DREKLING, P.Ia.; KRUTOV, P.I., kand.tekhn.nauk, red.; KHAVIN, B.N., red. izd-va; SHERSTNEVA, N.V., tekhn.red.

[Instructions for using organic plasticizing soap-stock wastes in making mixed and lime mortars] Ukazaniia po primeneniiu v smeshannykh i izvestkovykh rastvorakh organicheskogo plastifikatora - otkhoda soapstoka. Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1959. 14 p. (MIRA 13:6)

DREMAYLO, P.G.

ANDREYEV, A.B.; ANTONOV, A.I.; ARAPOV, P.P., BARMASH, A.I., BEDNYAKOVA, A.B.; BEMIN, G.S.; BERESNEVICH, V.V.; BERNSHTEYN, S.A.; BITYUTSKOV, V.I.; BLYUMENBERG, V.V.; BONCH-BRUYEVICH, M.D.; BORMOTOV, A.D.; BULGAKOV, N.I.; VEKSLER, B.A.; GAVRILENKO, I.V.; GENDLER, Ye.S., [deceased]; GERLIVANOV, N.A., [deceased]; GIBSHMAN, Ye.Ye.; GOLDOVSKIY, Ye.M.; GORBUNOV, P.P.; GORYALOV, F.A.; GRINBERG, B.G.; GRYUNER, V.S.; DAIKOVSKIY, N.F.; DZEVUL'SKIY, V.M., [deceased]; DREMAYLO, P.G.; DYBETS, S.G.; D'YACHENKO, P.F.; DYURNBAUM, N.S., [deceased]; YEGORCHENKO, B.F. [deceased]; YEL'YASHKEVICH, S.A.; ZHERNOV, L.P.; ZAVEL'SKIY, A.S.: ZAVEL'SKIY, F.S.; IVANOVSKIY, S.R.; ITKIN, I.M.; KAZHDAN, A.Ya.; KAZHINSKIY, B.B.; KAPLINSKIY, S.V.: KASATKIN, F.S.; KATSAUROV, I.N.; KITAYGORODSKIY, I.I.; KOLESNIKOV, I.F.; KOLOSOV, V.A.; KOMAROV, N.S.; KOTOV, B.I.; LINDE, V.V.; LEBEDEV, N.V.; LEVITSKIY, N.I.; LOKSHIN, Ya.Yu; LUTTSAU, V.K.; MANNENBERGER, A.A.; MIKHAYLOV, V.A.; MIKHAYLOV, N.M.; MURAV'YEV, I.M.; NYDEL'MAN, G.E.; PAVLYSHKOV, L.S.; POLUYANOV, V.A.; POLYAKOV, Ye.S.; POPOV, V.V.; POPOV, N.I.; RAKHLIN, I.Ye., RZHEVSKIY, V.V.; ROZENBERG, G.V.; ROZENTRETER, B.A.; ROKOTYAN, Ye.S.; RUKAVISHNIKOV, V.I.; RUTOVSKIY, B.N. [deceased]; RYVKIN, P.M.; SMIRNOV, A.P.; STEPANOV, G.Yu, STEPANOV, Yu.A.; TARASOV, L.Ya.; TOKAREV, L.I.; USPASSKIY, P.P.; FEDOROV, A.V.; FERE, N.E.; FRENKEL', N.Z.; KHEYFETS, S.Ya.; KHLOPIN, M.I.; KHODOT, V.V.; SHAMSHUR, V.I.; SHAPIRO, A.Ye.; SHATSOV, N.I.; SHISHKINA, N.N.; SHOR, E.R.; SHPICHENETSKIY, Ye.S.; SHPRINK, B.E.; SHTERLING, S.Z.; SHUTYY, L.R.; SHUKHGAL'TER, L. Ya.; ERVAYS, A.V.;

(Continued on next card)

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00041121(

ANDREYEV, A.B. (continued) .... Card 2.

YAKOVLEV, A.V.; ANDREYEV, Ye.S., retsenzent, redaktor; BERKEN-GEYM,B.M., retsenzent, redaktor; BERMAN, L.D., retsenzent, redaktor; BOLTINSKIY, V.N., retsenzent, redaktor; BONCH-BRUYEVICH, V.L., retsenzent, redaktor; VELLER, M.A., retsenzent, redaktor; VINOGRADOV, A.V., retsenzent, redaktor; GUDTSOV, N.T., retsenzent, redaktor; DEGTYAREV, I.L., retsenzent, redaktor; DEM'YANYUK, F.S., retsenzent; redaktor; DOBROSMYSLOV, I.N., retsenzent, redaktor; YELANCHIK, G.M. retsenzent, redaktor;ZHEMOCHKIN, D.N., retsenzent, redaktor; SHURAVCHENKO, A.N., retsenzent, redaktor; ZLODEYEV, G.A., retsenzent, redaktor; KAPLUNOV, R.P., retsenzent, redaktor; KUSAKOV, M.M., retsenzent, redaktor; LEVINSON, L.Ye., [deceased] retsenzent, redaktor; MALOV, N.N., retsenzent, redaktor; MARKUS, V.A. retsenzent, redaktor; METELITSYN, I.I., retsenzent, redaktor; MIKHAYLOV, S.M., retsenzent; redaktor; OLIVETSKIY, B.A., retsenzent, redaktor; PAVLOV, B.A., retsenzent, redaktor; PANYUKOV, M.P.,retsenzent, redaktor; PLAKSIN, I.N., retsenzent, redaktor; RAKOV, K.A. retsenzent, redaktor; RZHAVINSKIY, V.V., retsenzent, redaktor; RINBERG, A.M., retsenzent; redaktor; ROGOVIN, M. Ye., retsenzent, redaktor; RUDENKO, K.G., retsenzent, redaktor; RUTOVSKIY, B.N., [deceased] retsenzent, redaktor; RYZHOV, P.A., retsenzent, redaktor; SANDOMIRSKIY, V.B., retsenzent, redaktor; SKRAMTAYEV, B.G., retsenzent, redaktor; SOKOV, V.S., retsenzent, redaktor; SOKOLOV, N.S., retsenzent, redaktor; SPIVAKOVSKIY, A.O., retsenzent, redaktor; STRAMENTOV, A.Ye., retsenzent, redaktor; STRELETSKIY, N.S., retsenzent, redaktor;

(Continued on next card)

ANDREYEV, A.V., (continued) .... Card 3.

TRET'YAKOV, A.P., retsenzent, redaktor; FAYERMAN, Ye.M., retsenzent, redaktor; KHACHATUROV, T.S., retsenzent, redaktor; CHERNOV, N.V., retsenzent, redaktor; SHERGIN, A.P., retsenzent, redaktor; SHESTOPAL, V.M., retsenzent, redaktor; SHESHKO, Ye.F., retsenzent, redaktor; SHCHAPOV, N.M., retsenzent, redaktor; YAKOBSON, M.O., retsenzent, redaktor; STEPANOV, Yu.A., Professor, redaktor; DEM'YANYUK, F.S., professor, redaktor; ZNAMENSKIY, A.A., inzhener, redaktor; PLAKSIN, I.N., redaktor; RUTOVSKIY, B.N. [deceased] doktor khimicheskikh nauk, professor, redaktor; SHUKHGAL'TER, L. Ya, kandidat tekhnicheskikh nauk, dotsent, redaktor; BRESTINA, B.S., redaktor; ZNAMENSKIY, A.A., redaktor.

(Continued on next card)

ANDREYEV, A.V. (continued) .... Card 4.

[Concise polytechnical dictionary] Kratkii politekhnicheskii slovar'. Redaktsionnyi sovet; IU.A.Stepanov i dr. Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1955. 1136 p. (MLRA 8:12)

1. Chlen-korrespondent AN SSSR (for Plaksin)
(Technology--Dictionaries)

DERMAYLO, P.G., inzh.

Turbocyclones. Shor. inform. po obog. i brik. ugl. no.1:36-39 '57.
(Separators (Machines)) (MIRA 11:4)

DEMMAYLO, P.G., insh.

Mechanized removal of rock from the coal. Sbor. inform. po obog. i brik. ugl. no.1:47-52 '57. (MIRA 11:4)
(Coal preparation--Equipment and supplies)

DREMAYLO, P.G., inzh.; POPOV, A.A., inzh.

New machines and apparatuses for coal preparation in mineral suspensions. Sbor. inform. po obog. i brik. ugl. no.4:13-20 '57. (MIRA 11:6)

(Coal preparation--Equipment and supplies)

DREMAYLO, P.G., inzh.; POPOV, A.A., inzh.

Coal preparation in foreign countries using mineral suspensions.
Sbor. inform. po obog. i brik. ugl. no.4:49-50 '57. (MIRA 11:6)
(Coal preparation--Equipment and supplies)

BRATCHENKO, B.F., red.; ZABLODSKIY, G.P., red.; BARABANOV, F.A., red.; BABOKIN, I.A., red.; BARANOV, A.I., red.; VYSOTSKIY, P.I., red.; DRUMAYLO, P.G., red.; ZASADYCH, B.P., red.; ZVENIGORODSKIY, G.Z., red.; KAGAN, F.Ia., red.; LEVITSKIY, Ya.B., red.; LOTARNV, N.I., red.; MARCHENKO, M.G., red.; MITROFANOV, M.B., red.; PAKHALOK, I.F., red.; SHELKOV, A.A., red.; NIKOV, N.A., red. izd-va; IL'INSKAYA, G.M., tekhn. red.

[Safety rules for working in briquetting and preparation plants] Pravila bezopasnosti pri vedenii rabot na briketnykh i obogatitel'nykh fabrikakh. Izd.2. Obiazatel'ny dlia vsekh organizatsii i predpriiatii ugol'noi promyshlennosti. Moskva, Ugletekhizdat, 1958. 62 p. (MIRA 11:7)

1. Russia (1923- U.S.S.R.) Komitet po nadzoru za bezopasnym vedeniyem rabot v promyshlennosti i gornomu nadzoru.
(Coal preparation--Safety measures) (Briquets (Fuel))

DUDAVSKIY, V., inzh. [translator]; BLAGOVA, Z., inzh. [translator]; BEREZINA, G. [translator]; DZHIBLADZE, V. [translator]; CHERNENKO, B.G., kand.tekhn.nauk, red. [deceased]; DREMAYLO, P.G., otv.red.; TSUKERMAN, S.Ya., red.izd-va; GALANOVA, V.V., tekhn.red.

[Use of hydrocyclones in coal preparation; collection of translated articles] Primenenie gidrotsiklonov pri obogashchenii uglia; sbornik perevodov statei. Pod red. B.G.Chernenko. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po gornomu delu, 1960. 160 p. (MIRA 13:10)

1. Gosudarstvennyy proyektno-konstruktorskiy i nauchno-issledovatel'skiy institut po obogashcheniyu i briketirovaniyu ugley.
(Coal preparation) (Separators (Machines))

ULITSKIY, Lazar' Ioakhimovich; DREMAYLO, P.G., otv.red.; OSVAL'D, E.Ya., red.izd-va; NADEINSKAYA, A.A., tekhn.red.; LOMILINA, L.N., tekhn.red.

[Aspects of coal preparation economics]. Voprosy ekonomiki obogashcheniia uglei. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po gornomu delu, 1960. 210 p. (MIRA 14:2)
(Coal preparation)

KLIMANOV, Aleksey Dmitriyevich, kand. tekhn. nauk, dots.; RUDENKO, Konstantin Gerasimovich, kand. tekhn. nauk, dots.; KARPUKHIN, V.D., dots., retsenzent; OGLOBLIN, N.D., inzh., retsenzent; DREMAYLO, P.G., inzh., retsenzent; KUNIK, V.P., otv. red.; BOLDYREVA, Z.A., tekhn. red.

[Safety techniques and fire prevention in ore dressing and briquetting plants]Tekhnika bezopasnosti i protivopozharnaia tekhnika na obogatitel'nykh i briketnykh fabrikakh. Moskva, Gosgortekhizdat, 1962. 362 p. (MIRA 15:10)
(Coal preparation plants—Fires and fire prevention)
(Ore dressing—Safety measures)

SKLOVSKAYA, A.A., otv. red.; DREMAYLO, P.G., insh., zam. otv. red.; KAMINSKIY, V.S., kand. tekhn. nauk, zam. otv. red.; AVETISYAN, A.N., red.; BRILLIANTOV, V.V., kand. tekhn. nauk, red.; GALIGUZOV, N.S., kand. tekhn. nauk, red.; GORLOV, I.P., red.; GREBENSHCHIKOV, V.P., red.; DAVYDKOV, M.I., red.; ZVENIGORODSKIY, G.Z., red.; KARPOVA, N.N., red.; KOZKO, A.I., red.; MARUSEV, P.A., red.; PONOMAREV, I.V., red.; POPUTNIKOV, F.A., red.; SOKOLOVA, M.S., kand. tekhn. nauk, red.; TURCHENKO, V.K., red.; FILIPPOV, V.A., red.; YUSIPOV, A.A., red.; YAGODKINA, T.K., red.; MIRONOVA, T.A., red. izd-va; LOMILINA, L.N., tekhn. red.; MAKSIMOVA, V.V., tekhn.red.

[Technological trends in coal preparation] Tekhnicheskie napravleniia obogashcheniia uglei. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po gornomu delu, 1963. 120 p. (MIRA 16:10)

1. Gosudarstvennyy proyektno-konstruktorskiy i nauchno-issledovatel'skiy institut po obogashcheniyu i briketirovaniyu ugley. 2. Gosudarstvennyy proyektno-konstruktorskiy i nauchno-issledovatel'skiy institut po obogashcheniyu i briketirovaniyu ugley (for Yagodkina, Brilliantov).
(Coal preparation)

GORSKIY, Vs.V.; DREMICHEV, I.D.; STOLBOV, V.S.; BORISOV, V.V., mayor, red.; KRUPENNIKOVA, I.A., red.-leksikograf; ANIKINA, R.F., tekhn.red.

[German-Russian aeronautical dictionary] Nemetsko-russkii aviatsionnyi slovar'. Sost. V.V.Gorskim, I.D.Dremichevym i V.S.Stolbovym. Moskva, Voen.izd-vo M-va obor.SSSR, 1959. 411 p. (MIRA 12:12)

(Aeronautics--Dictionaries)
(German language--Dictionaries--Russian)

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Anglo-Russkiy slovar' po reaktivnomu oruzhiyu. Sost. I.D. Dremichev (i) V.P. Grechkin. Moskva, Voyenizdat, 1960.

383 p. tables.

"Ukazatel' Russkikh terminov" p. 266-380.

BURYAKOV, Yu.F.; DREMICHEV, I.D.; DUBOSHIN, V.N.; LOPATIN, R.N.; MAKSIMOV, M.I.; [redacted] A.A.; VASIL'YEV, A.A., red.; NIKOLAYEV, N.I., red.; KUROCHKIN, V.D., red.; BALASHOVA, M.V., red.-leksikograf; KUZ'MIN, I.F., tekhn. red.

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(English language--Dictionaries--Russian)
(Aeronautics--Dictionaries)

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[German-Russian aeronautical dictionary] Nemetsko-russkii aviatsionnyi slovar'. Izd.2., perer. i dop. Moskva, Voenizdat, 1964. 631 p. (MIRA 17:11)

DREMIL, D.

DREMIL, D. Resurfacing roads. p. 149

Vol. 3, no. 4, Apr. 1955
CESTE I MOSTOVI
TECHNOLOGY
Zagreb

So: East European Accession, Vol. 6, no. 3, March 1957

DREMIL, D.

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SOURCE: East European Accessions List (EEAL), LC, Vol. 5, No. 2, Feb. 1956

5(4),2(5)

AUTHORS: Dremin, A. N., Pokhil, P. F. SOV/20-127-6-28/51

TITLE: The Width of the Chemical Reaction Zone in a Trotyl Detonation Wave

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 6, pp 1245-1248 (USSR)

ABSTRACT: The structure of the plane detonation wave as proposed by Ya. B. Zel'dovich is the issue for the following study. The detonation wave consists of a shock front and is followed by the chemical reaction zone with the width a, that is limited by the Chapman-Zhuge-plane (Fig 1). The experimental measurement of a was described in reference 2. The profile of the shock wave in metals is determined by measurement of the initial velocity W of the free surface of variously thick metal lamellas. The measurement was performed by means of electroconductors whose signals were recorded by an oscillograph. A formula for a is deduced and a total error of about 20-30% computed. Further formulas for the pressure P, mass velocity U and the adiabatic shock line D are described for magnesium, copper, and aluminium. Measuring results are put down in table 1 and figure 2, the calculated amounts of P and U in table 2. In regard of the reflected wave, the amount

Card 1/2

The Width of the Chemical Reaction Zone in a Trotyl Detonation Wave SOV/20-127-6-28/51

0.22 mm is found for a (Fig 3). Furthermore, a formula for the reaction degree τ is given and the dependence of a on the density of the trotyl graphically described (Fig 4). There are 4 figures, 4 tables, and 5 references, 2 of which are Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

PRESENTED: April 7, 1959, by V. N. Kondrat'yev, Academician

SUBMITTED: March 31, 1959

Card 2/2

SOV/20-128-2-11/59

15(6)

AUTHORS: Dremin, A. N., Adadurov, G. A.

TITLE: Adiabatic Shock Curve of Marble

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 2, pp 261 - 264 (USSR)

ABSTRACT: The laws of the conservation of mass and momentum during the passage of the substance through the shock wave allow for a reduction of the determination of the density ϱ and the pressure P of shock compression to the determination of easily measurable kinematic parameters, i. e. of the translation rate of the two dimensional wave front D in an undisturbed medium and of the velocity u of matter behind the wave front:

$\varrho = \varrho_0 \frac{D}{D - u}$; $P = \varrho_0 Du$. ϱ_0 denotes the initial density of the medium. However, if the adiabatic shock curve of any substance is known, only D is to be measured in the material under investigation to determine its adiabatic shock wave. This method is based upon the following circumstances: The shock wave passes from the substance imposed on the marble (with known adiabatic

Card 1/3

shock curve) to the marble itself. The (P-u)-diagram determines the state of the two media during this transition by the common intersection of the wave straight of the marble and the expansion curve of the above medium. The tangent of the angle of inclination of the wave straight in marble amounts to $\rho_o D$. The authors used aluminum as a substance with known adiabatic shock curve:

$$D_{Al} = 5.190+20.77 \log\left(\frac{W_{Al} + 10.895}{10.895}\right) \frac{km}{sec}$$, where D_{Al} denotes the shock-wave velocity in the aluminum plate, W_{Al} the velocity of motion of its free surface (in km/sec), which equals double the mass velocity ($W_{Al} = 2u_{Al}$). Consequently, measurement of W_{Al} or D_{Al} is sufficient for a determination of the coordinates of point a. Figure 1 shows the principal experimental arrangements for the measurement of W(A) and D(B). Various details of measurement are then briefly discussed. In measuring D and W, the authors used the average results of 4-8 experiments. A table and two diagrams illustrate the experimen-

tal results. Accordingly, two distinctly separate ranges are visible in the behavior of marble, the variation being ascribed to phase transformation. The following empirical equations result from experiments: $D = (3.39+2.C\,u)$ km/sec, $P = 42.6.10^9[(\varrho/\varrho_0)^{7.23}-1]$ bar (before phase transformation; $D=(4.01+1.30\,u)$ km/sec, $P=106.10^9[(\varrho/\varrho_0)^{4.1}-1]$ bar (after phase transformation). The range pertinent to mixed phases cannot be ascertained by the method described above. Nevertheless, the limits of this range could be rather accurately outlined, since the configuration of two shock waves exists within the range of phase transition. There are 4 figures, 1 table, and 6 references, 2 of which are Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

PRESENTED: April 14, 1959, by V. N. Kondrat'yev, Academician
SUBMITTED: April 11, 1959

Card 3/3

66182

2.5000
5.1300(A)

~~5(4), 2(5)~~ SOV/20-128-5-36/67

AUTHORS: Dremin, A. N., Pokhil, P. F.

TITLE: The Constants of the Detonation Wave of Trotyl, Hexogen, Nitroglycerin, and Nitromethane

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 5, pp 989-991 (USSR)

ABSTRACT: The authors report on the results of an experimental determination of the mechanical constants of detonation waves in the Chapman - Zhuge plane. The three-equation system: (1) $\rho_0 D = \rho(D - U)$ (conservation of mass); (2) $P = \rho_0 DU$ (conservation of momentum); (3) $D = U + C$ (Chapman - Zhuge condition) contains five unknown constants: D = velocity of detonation, ρ = density of the explosion products, U = velocity of the explosion products, C = sonic velocity in the explosion products, and P = pressure of the explosion products in the Chapman - Zhuge plane. D and P were determined. D was measured by means of ionization pickups. P was indirectly measured. The authors measured the initial velocity W of a metal platelet fastened to the explosive.

Card 1/3

The Constants of the Detonation Wave of Trotyl, Hexogen, Nitroglycerin, and Nitromethane

$W = 2U_M$ (U_M = velocity of mass in the metal behind the shock-wave front). Since the adiabatic curve of the shock of the metal is known, the formula for P was derived from $P_M = \rho_{oM} D_M U_M$. The formula defines the relationship between the pressure in the detonation wave and the pressure of the shock wave propagating within the metal at velocity D_M and with initial density ρ_{om}: $P = \frac{P_M}{2}\left(1 + \frac{\rho_o D}{\rho_{oM} D_M}\right)$. Magnesium platelets ($\rho_{oMg} = 1.72$ g/cm^2) were used for experiments on trotyl and hexogen, and aluminum platelets ($\rho_{oAl} = 2.70$ g/cm^2) for nitroglycerin and nitromethane.

Figure 2 shows the experimental data for W. Table 1 contains the resultant values of ρ_o, D, U, P, C, and ρ. Figure 3 indicates the linear dependence of the mass velocity of trotyl and Hexogen

Card 2/3

66182

The Constants of the Detonation Wave of Trotyl, Hexogen, Nitroglycerin, and Nitromethane SOV/20-128-5-36/67

on their initial density. Herefrom it follows that $\frac{D}{U} - 1$ remains constant within a wide range for explosives of great initial density. There are 3 figures, 1 table, and 6 references, 3 of which are Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

PRESENTED: April 27, 1959 by V. N. Kondrat'yev, Academician

SUBMITTED: April 24, 1959

Card 3/3

DREMIN, A.N. (Moskva); KARPUKHIN, I.A. (Moskva)

Method for determining the shock adiabatic curves of disperse substances. PMTF no.3:184-188 S-O'60. (MIRA 14:7)
(Shock waves)
(Compressibility)

86783

S/076/60/034/011/015/024
B004/B064

11.8100

AUTHORS: Dremin, A. N. and Pokhil, P. F. (Moscow)

TITLE: Investigation of the Zone of Chemical Reaction of Trotyl

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 11, pp. 2561-2570

TEXT: The authors proceed from a paper by Ya. B. Zel'dovich (Ref. 1) according to which the profile of the plane detonation wave has the form shown in Fig. 1. AB is the zone of chemical reaction; a is its width; and BC is the section in which the explosion products fly asunder. This assumption was checked by the authors. The experimental method is based on the fact that the parameters of the shock wave in the metal can be determined by measuring the velocity w of the free surface of metal films of different thicknesses. The calculation is made by means of the diagram $x = f(t)$ shown in Fig. 3. The ordinate is the boundary between metal and explosive. $a = bD(u_1 + c_1 - D_2)/\left[D_2(u_1 + c_1 - \alpha D)\right](1 - \alpha)$ (1) is written. b denotes the thickness of the metal in which the chemical peak is

Card 1/3

Investigation of the Zone of Chemical Reaction of Trotyl

S/076/60/034/011/015/024
B004/B064

extinguished; D is the rate of detonation; D_2 is the velocity of the shock wave in the metal; u_1 and c_1 are the mass and sonic velocities in the metal at the Jouguet point, $\alpha = \bar{u}/D$, where $\bar{u}$ is the average velocity near the peak. On the basis of the experimental data the experimental equation $a = 0.41/\rho_0^{1.44}$ mm was derived (ρ_0 is the initial density of trotyl, which varied from 1.00 to 1.59 g/cm^3). Accordingly, the value of a was only tenths of a millimeter and by one order of magnitude smaller than the critical diameter d_{cr}. a increases with decreasing ρ_0, and decreases with an increase of pressure. The duration of the chemical reaction of trotyl in detonation is $\sim 10^{-7} - 10^{-8}$ sec. The hydrodynamic theory of detonation suggested by Ya. B. Zel'dovich confirms the detection of a zone of chemical reaction with detonation parameters (pressure and mass velocities) increased as compared to the Jouguet point. A. D. Margolin and V.M.Sosov, collaborators of the authors' institute, calculated the shock adiabate. A. Ya. Apin, L. G. Bolkhovitinov, Yu. N. Ryabinin, Yu. B. Khariton, and L. N. Stesik are mentioned. There are 9 figures, 8 tables, and 10

Card 2/3

86783

Investigation of the Zone of Chemical Reaction of Trotyl

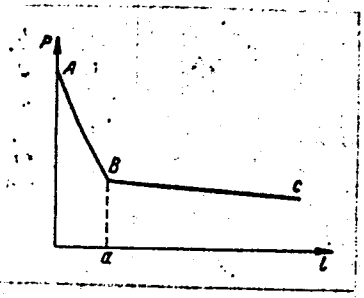
S/076/60/034/011/015/024
B004/B064

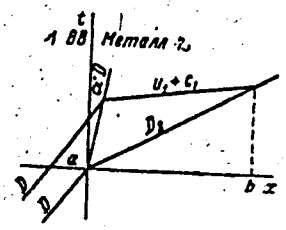
references: 7 Soviet and 3 US.

ASSOCIATION: Akademiya nauk SSSR, Institut khimicheskoy fiziki (Academy of Sciences USSR, Institute of Chemical Physics)

SUBMITTED: March 4, 1959

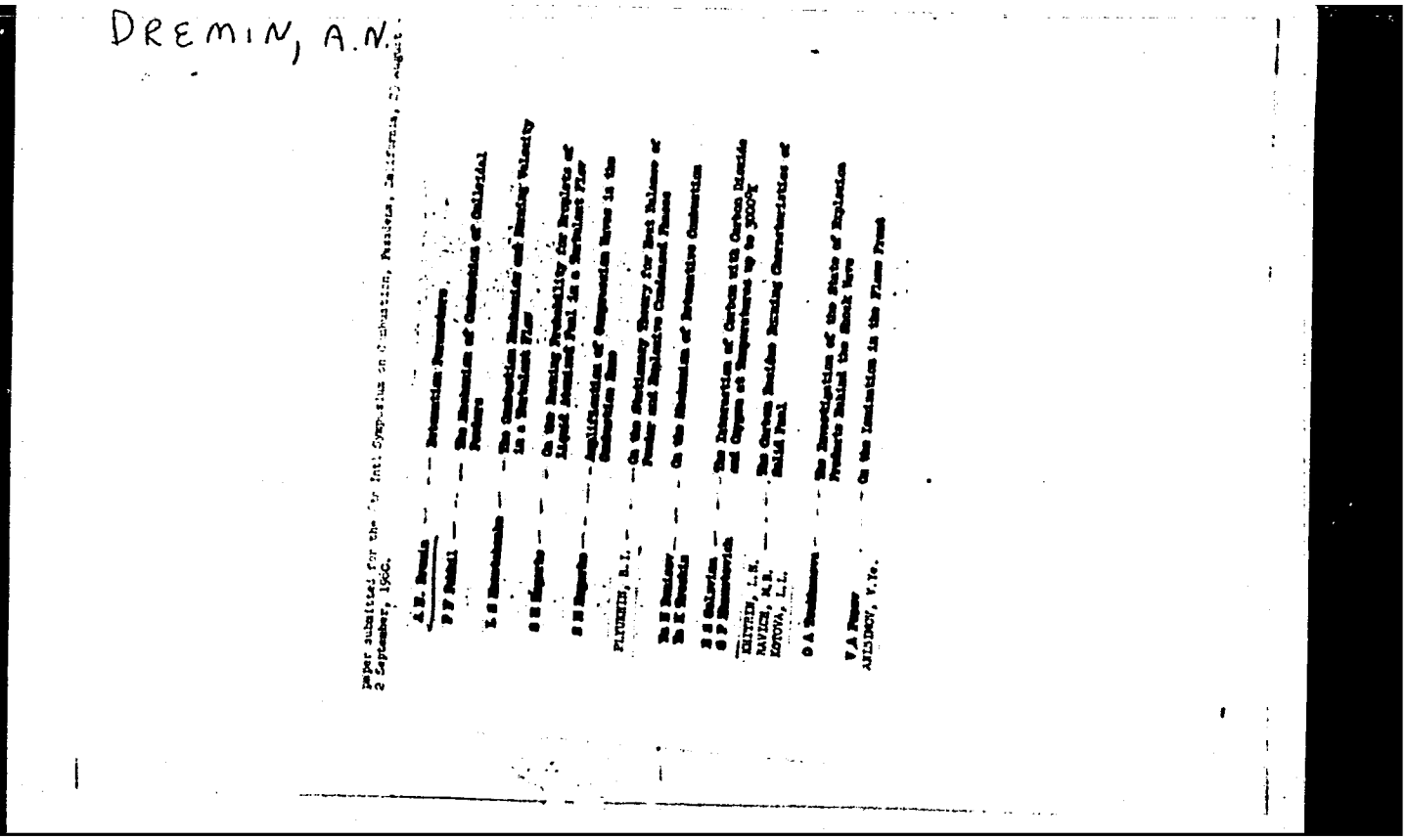
Legend to Fig. 3: 1: Explosive; 2: Metal.





Card 3/3

DREMIN, A.N.



26.5000
11.1000

80010

AUTHORS: Dremin, A. N., Pokhil, P. F., Arifov, M. I. 3/020/60/131/05/044/069
B011/B117

TITLE: Effects of Aluminum on the Detonation Constants of Trotyl[1]

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 131, Nr 5, pp 1140-1142 (USSR)

TEXT: Based on their results, the authors arrived at the following conclusion concerning the behavior of aluminum in the chemical reaction space of the detonation wave of trotyl: with high-density aluminum charges (of all sizes), this metal is inert in the front of the detonation wave. Aluminum begins to react with decreasing density of the charge. Since thereby lower oxides (AlO and Al_2O) with lower heats of formation (39 kcal/mole for Al_2O as compared to the heat of formation for Al_2O_3 which is 393.1 kcal/mole) form, and oxygen previously bound to other products is consumed, Al has an endothermic effect. Moreover, the composition of the gases is impaired (possibly their quantity is decreased) when aluminum oxides of any type form which must necessarily lead to the reduction of the detonation constants also. A. F. Belyayev (Ref 6) convincingly proved that the efficiency of explosives containing high-molecular explosion products is less than that of substances generating low-molecular explosion products. With a further reduction of the charge density, conditions may arise under which the lower aluminum oxides in the

Card 1/3

Effects of Aluminum on the Detonation Constants of Trotyl

S/020/60/131/05/044/069
B011/B117

reaction space are converted to Al_2O_3. This should necessarily lead to an increase of the detonation constants. With high charge densities, these constants are lowered by aluminum of each particle size. For comparison with aluminum, the authors made experiments with admixtures of quartz sand (SiO_2) and tungsten to the trotyl (Table 1). Unexpectedly, the dependence of the detonation velocity of trotyl mixed with fine sand on the charge density (Fig 1) showed a sharp break at a density of 1.54 g/cm^3. Apparently, SiO_2 passes over into another modification. The authors explain the increasing effect of SiO_2 found in their experiments by the increased compressibility. The experimental values obtained for the velocity of motion of the explosion products of trotyl with inert admixtures can be well described by the equation $u = u_o\varrho_o/\varrho_1$ (1), with u_o being the velocity of explosion products of pure trotyl for a density of the mixed charge ϱ_o, and ϱ_1 the density of the mixture. The velocities of the explosion products measured in the experiments and calculated according to equation (1) are given in table 2. Hence, it follows that the 0.2 μ aluminum

4

Effects of Aluminum on the Detonation Constants of Trotyl

S/020/60/131/05/044/069
B011/B117

particles with a charge density of 1.49 g/cm^3 have a stronger reducing effect on the characteristics of the detonation wave as compared to the effect exerted by inert admixtures. This proves that aluminum reacts to a different extent according to the size of its particles. The authors disprove the assumption made by S. B. Ratner and Yu. B. Khariton (Ref 4) according to which Al_2O_3 forms in the reaction space which absorbs considerable quantities of heat on evaporation. Al_2O_3 does not exist at all in the vapor phase, but is decomposed to AlO which, in turn, passes over into Al_2O (Ref 5). There are 1 figure, 2 tables, and 8 references, 6 of which are Soviet.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences, USSR)

PRESENTED: November 4, 1959, by N. N. Semenov, Academician

SUBMITTED: November 4, 1959

Card 3/3

31501
S/020/60/133/006/012/016
B101/B206

11.1360

AUTHORS: Dremin, A. N., Adadurov, G. A., and Rozanov, O.K.

TITLE: Detonation of nitromethane close to the limit

PERIODICAL: Doklady Akademii nauk SSSR, v. 133, no. 6, 1960, 1372 - 1374

TEXT: The measurement of the shock adiabate of nitromethane led to the statement that inhomogeneities occurred on the side of the charge. In order to study this effect, the propagation of the detonation in nitromethane was photorecorded simultaneously at the side- and end face of the charge by means of time-lapse motion camera. The experimental device is shown diagrammatically in Fig. 1. The magnesium platelet 2 of 5 mm thickness was placed on the end face of the active trotyl charge 1 (ρ_0 = 1.43 g/cm³) diameter 40 mm). On it, the Plexiglass cylinder 3 (wall thickness which contained nitromethane, was pasted. A plane detonation wave through the active charge. By means of mirror 4 the end face ... charge was projected into the ... By means of the photorecorder ... the discussion of the photographs obtained ... Figs. 2 - 4 are not reproducible]

31501
S/020/60/133/006/012/016
B101/B206

Detonation of nitromethane...

yielded the following results: 1) Dark sections (inhomogeneities) occur on the detonation front (recorded at the end face). 2) The dark sections increase during the propagation of the detonation in nitromethane. 3) To the increase of the dark sections on the end face corresponds a steady decrease of the shine of the side face, with distinct transitions to glare, which spreads against the direction of detonation and reminds of a retonation wave. 4) The rate of detonation of nitromethane was constant for all experiments and amounted to 6300 m/sec. The following conclusions are drawn from these results: If the detonation of nitromethane occurs close to the limit, the front of the detonation wave does not cover any more the entire cross section of the charge. Zones remain which did not enter into reaction and which only detonate subsequently. Under the effect of the shock wave, the nondetonated nitromethane gets opaque, which leads to the dark inhomogeneities observed. The development of centers of prevented detonation and the mechanism of their subsequent reaction has not been clarified as yet. Studies by Yu. N. Shchelkin (ZhETF, 36, 2(1959)), Yu. N. Denisov and Ya. K. Troshin (Zhurn. prikl. mekhaniki i tekhn. fiziki SO AN SSSR, no. 1 (1960)) are however pointed out, who observed similar inhomogeneities in gas detonations close to the limit, and found that the

Card 2/4

Detonation of nitromethane...

plane wave front is unstable and the reaction is not initiated over the total cross section of the charge, but in individual centers. A. Ya. Apin and V. K. Bobolev (DAN, 58, no. 2 (1947)) also recorded inhomogeneities of the detonation in powdery explosives. There are 4 figures and 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc. The reference to English-language publication reads as follows: T. E. Holland, M. E. Malin, T. P. Cotter, Nature, 178, no. 4523, 38 (1956).

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences, USSR)

PRESENTED: April 2, 1960 by V. N. Kondrat'yev, Academician

SUBMITTED: April 1, 1960

Card 3/4

31501
S/020/60/133/006/012/016
B101/B206

Detonation of nitromethane...

Fig. 1. Diagram of the experimental setup.

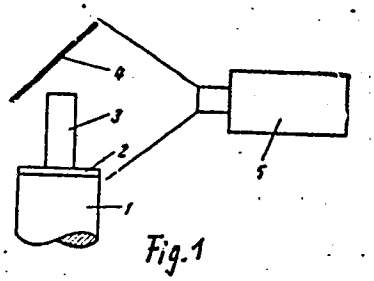


Fig.1

Card 4 /4

89405

S/062/61/000/001/014/016
B101/B220

11.8100

AUTHORS: Dremin, A. N. and Adadurov, G. A.

TITLE: Detonation of inhomogeneous charges of TG 68/32

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, no. 1, 1961, 157-158

TEXT: The authors measured the detonation parameters of inhomogeneous trotyl hexogen charges TG 68/32 (TG 68/32), corresponding to 68% by weight of trotyl, 32% by weight of hexogen). The charges were made by melting the trotyl ($d = 1.672$ g/cm^3) and adding lumps of high-density hexogen ($d \approx 1.80$ g/cm^3). The parameters of the detonation wave were measured on the basis of the shock wave in aluminum. The experimental data are summarized in the following table:

No.	dimension l of hexogen particles, mm	D, km/sec	$P \cdot 10^9$, bars
1	$10 < l < 14$	8.32	239
2	$5 < l < 10$	8.25	245
3	~ 0.05	7.56	255

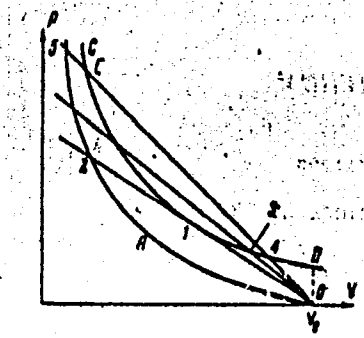
Card 1/3

The detonation rate in the inhomogeneous charges is greater than that in homogeneous ones, whereas the pressure at the wave front is lower. This is explained in the diagram of Fig. 2. OA2 is the shock adiabatic curve of the explosive, C1D the shock adiabatic curve for the explosion products, corresponding to the total energy of explosion. The straight lines originating in point O are the Michelson lines corresponding to different detonation rates. According to the hydrodynamic theory of Ya. B. Zel'dovich, a normal detonation reaches point 1. Points of the adiabatic curve C1D above point 1 (range of supercompressed detonation) cannot be reached in steady detonation, nor points below point 1 (range of incompletely compressed detonation). These points will be reached, however, if the rate of the process is not determined by the shock wave, but by other causes, e.g., by the propagation of detonation in the hexogen lumps and in trotyl. A. S. Kompaneyets is mentioned. There are 2 figures, 1 table, and 3 Soviet-bloc references.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR
(Institute of Chemical Physics, Academy of Sciences USSR)

SUBMITTED: March 9, 1960

Fig. 2



Фиг. 2. Диаграмма P—V

Card 3/3

ADADUROV, G.A.; BALASHOV, D.B.; DREMIN, A.N.

Investigating the cubic compressibility of marble at high pressures.
Izv.AN SSSR.Ser.geofiz. no.5:712-716 My '61. (MIRA 14:4)

1. Akademiya nauk SSSR, Institut khimicheskoy fiziki.
(Marble) (Compressibility)

25484
S/020/61/139/001/016/018
B103/B229

11.8200

AUTHORS: Dremin, A. N. and Rozanov, O. K.

TITLE: Detonation of mixtures of nitromethane with acetone

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 1, 1961, 137-138

TEXT: The authors point out that there is no unambiguous experimental confirmation supporting the assumption (K. I. Shchelkin, Ref. 3: ZhETF, 36, No. 2 (1959)) that in the detonation of condensed explosives the reaction does not take place over the whole front of the detonation wave. On the contrary, it occurs in single centers - tne points of collision of oblique compression shocks - which are dislocated along the impact front of the detonation wave. These data refute Ya. B. Zel'dovich's hydrodynamic detonation theory (Ref. 1: ZhTF, 10, 542 (1940)) which refers to a smooth front. The authors investigated the detonation of nitromethane (NM) and its mixtures with acetone (A) according to a method described before (A. N. Dremin et al. Ref. 9: DAN, 133, No. 6 (1960). It is based on photographic development (on СФР(SFR) [Abstracter's note: appliance not stated] of the detonation process into the front surface of the charge. The transparency

Card 1/4

Detonation of mixtures of ...

of NM and A makes it possible to observe the whole process of propagation of the detonation. The photographic development of this process shows a nonuniform luminosity of the anterior front of the detonation. The pictures show a system of intersecting bright and dark bands following a strictly kept inclination course for the relative mixture. This inclination determines the velocities of propagation of the heterogeneities at the front of the detonation wave. From this the authors conclude that the reaction does not start and follow a synchronous course over the whole front, but in single centers. The bright lines on the pictures correspond to the spots of intense chemical reaction, whilst the dark ones show the absence of a reaction. The authors come to the conclusion that there are spots with most favorable conditions for the course of the reaction. These are the collision points of the oblique impact waves in the front of the detonation wave. With the increase of the percentage content of A in the mixture tne number of heterogeneities is decreased at the diameter of the charge. In this case they are so small that they cannot be distinguished by the naked eye. From this the authors conclude that these can also be found in pure NM, only they cannot be detected by means of the usual appliances. If the content of A in the mixture is higher the hetero-

25484
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B103/B229

geneities become so great that detonation is extinguished. At a volume ratio NM/A = 80 : 20 and 78 : 22, the detonation is propagated in a charge which is about 5 diameters long, and this process is steady. The systems of the heterogeneities (bands) do not change. When the detonation has covered 3.5 - 4 diameters of the charge it continues to be propagated constantly. From this the authors conclude that the determined type of propagation is characteristic of a detonation of explosives of this kind. At a ratio of NM/A = 75 : 25 the detonation is extinguished near the end of the charge. The authors state finally that the detonation front in liquid explosives is not flat, since the reaction sets in by centers. They thank Ya. K. Troshin and G. A. Adadurov for discussion and A. I. Larin, G. A. Gur'yanov, V. M. Chernyshov, and Y. A. Paramonov for their assistance in the experiments. There are 2 figures and 10 references: 9 Soviet-bloc and 1 non-Soviet-bloc. The latter reads: M. A. Cook et al., Ref.10, J. appl. Phys., 27, No. 3, 269 (1956).

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

Card 3/4

ADADUROV, G.A. (Moskva); DREMIN, A.N. (Moskva); PERSHIN, S.V. (Moskva); RODIONOV, V.N. (Moskva); RYABININ, Yu.N. (Moskva)

Shock wave compression of quartz. PMTF no.4:81-89 Jl-Ag '62. (MIRA 16:1)

(Shock waves) (Compressibility) (Quartz)

ACCESSION NR: AT4035834 S/2534/64/000/024/0091/0098

AUTHOR: Ryabinin, Yu. N.; Rodionov, V. N.; Dremin, A. N.

TITLE: Possibilities of polymorphic transitions under shock-wave compression

SOURCE: AN SSSR. Komitet po meteoritam. Meteoritika, no. 24, 1964. Trudy* Dosyatoy Meteoritnoy konferentsii v Leningrade 29 maya-1 iyunya 1962 g., 91-98

TOPIC TAGS: silica, meteorite, coesite, meteorite crater, polymorphic transition, high pressure geophysics, quartz coesite transition, stichovite

ABSTRACT: The structure and physical properties of coesite are discussed, together with the quartz-coesite transition and the entire history of discovery of silica modifications. Much of this introductory discussion is based on American sources. Such a transition was discovered by S. M. Stishov and S. V. Popova in the USSR in 1961. They discovered a new silica modification having a density 64% higher than quartz. It was formed artificially at a static pressure of 160,000-180,000 kg/cm^2 and a temperature of 1200—1400C and had a density of 4.35 g/cm^3. It crystallizes in a tetragonal structure of the rutile type and has very high refractive indices. Under ordinary conditions it is metastable; when heated to 900C at atmospheric pressure, it undergoes a transition to cristobalite. Various finds of coesite in meteor craters are described, and there is a discussion of ex-

Card 1/3

ACCESSION NR: AT4035834

periments made to determine the possibility of formation of coesite under natural conditions at high pressures and temperatures. The authors undertook such an experiment to achieve a quartz-coesite transition under the influence of a shock wave; an effort was made to determine at exactly what pressure the transition would occur. Determination of the pressure and corresponding temperature of this transition made it possible to estimate the minimum velocity of flight of a meteorite at the time of its impact against the earth's sandstone surface at which the formation of coesite would occur. The mathematical solution of this problem is presented. It is shown that a polymorphic transition with a large jump in density is possible during an extremely brief application of high pressure and temperature (of the order of 10^{-6} sec). The authors then attempt to estimate the mass and velocity of a meteorite on the basis of the size of the crater formed. Indirect methods are required, owing to an inadequate knowledge of the properties of rocks and soils. The primary method used is comparison of the craters of explosions and meteor craters, which outwardly appear very similar. An expression is derived giving the dependence of the radius of a crater on the momentum of the falling body. An estimate was made of the minimum velocity of the meteorite forming the Wabar meteorite crater. The value determined was 2 km/sec; the maximum mass of the meteorite determined from the formulas presented was 1000 tons. The cited formulas are correct for relatively small craters with a radius not greater than about 100 m. Orig. art. has: 12 formulas, 3 figures, and 1 table.

Card 2/3

3/3

ACCESSION NR: AT4035834

ASSOCIATION: Komitet po meteoritam, Akademiya nauk SSSR (Committee on Meteorites, Academy of Sciences SSSR)

SUBMITTED: 00 ATD PRESS: 3077 ENCL: 00

SUB CODE: ES, AA NO REF SOV: 009 OTHER: 012

DREMIN, A. N.

Critical diameter for the detonation of liquid explosives.
Dokl. AN SSSR 147 no.4:870-873 D '62. (MIRA 16:1)

1. Institut khimicheskoy fiziki AN SSSR. Predstavleno akademikom V. N. Kondrat'yevym.

(Explosives) (Detonation)

DREMIN, A.N. (Moskva); ROZANOV, O.K. (Moskva); TROFIMOV, V.S. (Moskva)

The mechanism underlying detonations of liquid explosives. FMTF no.1:130-132 Ja-F '63. (MIRA 16:2)
(Detonation) (Explosives)

L 18278-63 EPA/EPA(b)/EPF(c)/EPR/EWT(l)/EWT(m)/BDS/ES(s)-2 AEDC/AFFTC/
APGC/ASD/RPL/SSD Paa-4/Pd-4/Pr-4/Ps-4/Pt-4 RM/WW/JW
ACCESSION NR: AP3006131 S/0207/63/000/004/0101/0103

AUTHOR: Buravova, S. N. (Moscow); Dremin, A. N. (Moscow); Rozanov, O. K. (Moscow); Trofimov, V. S. (Moscow) 95 91

TITLE: Study of the smoothness of a detonation wave front

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 4, 1963, 101-103

TOPIC TAGS: detonation, detonation wave front, nitromethane, acetone, liquid explosive, structure, detonation front structure, reflected light

ABSTRACT: A study of the surface structure of a detonation wave front propagating in liquid nitromethane-acetone mixtures proved that the front is not smooth and thus confirmed a previous conclusion that detonation waves in liquids do not propagate at the same rate in all points of the front. The study was made by the following method: The test mixture, which was placed in a vessel with a polished metal plate at the bottom, was detonated by a charge located under the plate. A layer of water above the test mixture served for control purposes.

Card 1/2

L 18278-63
ACCESSION NR: AP3006131

4

Argon heated by compression with a detonation-induced shock wave was used as a light source. The light reflected from the metal plate and from the nitromethane-acetone and water interphase was recorded by a photoregister. Photographs obtained during propagation of the detonation wave disclosed traces caused by reflection from the moving metal plate and the front of the shock wave propagating in the test mixture and in water. Traces caused by reflection from the detonation wave front were not observed. Another experiment conducted by the light scattering technique with a nonpolished metal plate and focusing of the scattered light beam showed a trace resulting from light scattering on the detonation wave front. The results indicate that the absence of a reflected light trace in the first experiment is not caused by light absorption but rather by the fact that the detonation front has a surface roughness which is much larger than the wave length of light. An approximate evaluation of these and previous experiments suggests that the dimension of the detonation front nonuniformity in the direction of the wave propagation is not more than one order of magnitude smaller than the dimension in the plane of the front. "The authors thank V. A. Kolomenkin, G. G. Nemtsov, V. A. Paramonov, and D. I. Gerasimov for their help in conducting the experiments." Orig. art. has: 3 figures.

Card 2/3

ACCESSION NR: AP4005206 S/0207/63/000/006/0131/0134

AUTHORS: Dremin, A. N. (Moscow); Koldunov, S. A. (Moscow); Shvedov, K. K. (Moscow)

TITLE: Initiating a detonation in cast trotyl by means of a shock wave

SOURCE: Zhurnal prikl. mekhan. i tekhn. fiz., no. 6, 1963, 131-134

TOPIC TAGS: detonation, explosive, shock wave, trotyl, high explosive, combustion, shock initiation, shock detonation initiation

ABSTRACT: TNT used in this study had a sp. gr. of 1.62 and was subjected to a shock wave with pressure at the wave front of 100 000 atm. The shock wave was produced by detonating a charge 80 mm in diameter and 130 mm long next the test sample, with a plate of plexiglass 20 mm thick between. The velocity of the shock wave and the velocity of material were measured over the entire range from site of shock-wave entry to the establishment of normal detonation. The relationships of velocities to distance are shown in Fig. 1 on the Enclosure. It is seen that the two velocities depend on distance in a similar fashion. The authors have shown that chemical reaction begins immediately when affected by a shock wave of this magnitude. They conclude that in the non-ideal regime (as set up in this experiment for detonation) a detonation occurs at the interface (with the plexiglass)

Card 1/2

ACCESSION NR: AP4005206

almost instantaneously on arrival of the shock wave, but the amplitude of the wave is insufficient to cause chemical reaction as is observed for ideal detonation. The observed reaction must then begin at defects, such as cracks, pores, etc., where "hot points," are formed. The possibility of initiating detonation is determined by the ratio between amount of generated energy and amount of energy loss associated with attenuation of the shock wave, whether in passing through the TNT or through the inert material. The velocity of the wave front and, consequently, all the parameters at the front and the amount of generated energy affect one another in such a way that an increase in amount of generated energy leads to an increase in velocity of the front and to an increase in pressure, and an increase in pressure leads to an increase in velocity. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 13May63 DATE ACQ: 09Jan64 ENCL: 01

SUB CODE: PR NO REF SOV: 004 OTHER: 009

Card 2/3

DREMIN, A.N.; SHVEDOV, K.K.; VERETENNIKOV, V.A.

Study of the detonation of PzhV-20 ammonite and some other explosives. Vzryv. delo no.52/9:10-25 '63. (MIRA 17:12)

DREMIN, A.N.

Mechanism of the detonation of liquid explosives. Vzryv. delo no.52/9:25-39 '63. (MIRA 17:12)

1. Institut khimicheskoy fiziki AN SSSR.

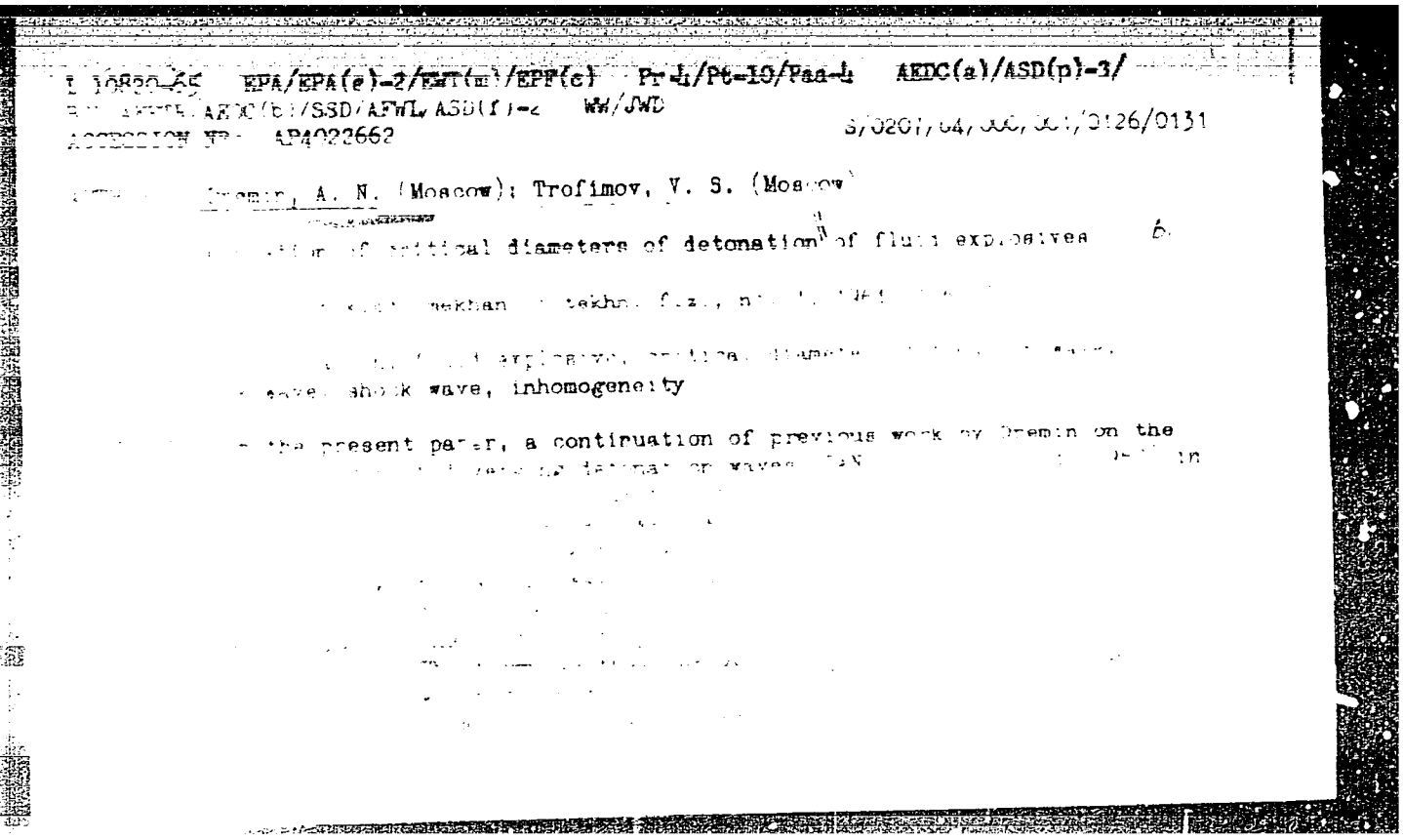
DREMIN, A. N.; TROFIMOV, V. S.

"On the nature of the critical diameter."

report presented at the 10th Intl Combustion Symp, Cambridge, U.K., 17-21 Aug 64.

Inst of Chemical Physics, AS USSR, Moscow.

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00041121(



L 10890-65 EPA/EPA(s)-2/EWT(m)/EPF(c) Pr-4/Pt-10/Pab-4 AEDC(a)/ASD(p)-3/
AF5(c)/SSD/AFWL/ASD(f)-2 WW/JWD
ACCESSION NR: AP4022662 S/0207/64/000/001/0126/0131

Dremin, A. N. (Moscow); Trofimov, V. S. (Moscow)

Determination of critical diameters of detonation of fluid explosives

Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 1, 1964, 126-131

TOPIC TAGS: explosive, critical diameter, detonation wave, shock wave, inhomogeneity

ABSTRACT: In the present paper, a continuation of previous work by Dremin on the [illegible] of detonation waves [illegible] in

L 10820-65
ACCESSION NR: AP4022662

picture of the flow, with formation of waves of lack of reaction determining d_*, is [illegible] The authors study a plane [illegible] found experimentally. However, the somewhat lower values of d_* obtained in their computation can be explained more easily by uncertain values of some of the [illegible] explosive are known. Since certain of the variables in the formula cannot yet be [illegible] the problem could be reversed, [illegible] form, as [illegible] figures, and [illegible] tables.

ASSOCIATION: none

SUBMITTED: 01Jul65 ENCL: 00

SUB CODE: WA, ME NO REF SOV: 012 OTHER: 004

ACCESSION NR: AP4034282 S/0207/64/000/002/0154/0159

AUTHORS: Dremin, A. N. (Moscow); Shvedov, K. K. (Moscow)

TITLE: Determining the Chapman Jouguet pressure during the time of reaction in the detonation waves of powerful explosives

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 2, 1964, 154-159

TOPIC TAGS: explosive, detonation, trotyl, Chapman Jouguet region, oscillograph, polytropy index, chemical reaction

ABSTRACT: Experimental measurements were taken of the mass velocity u, pressure p, and time of chemical reaction τ during the detonation of solid explosives in the ideal detonation regime. The method used was based on the work of A. A. Brish, M. S. Tarasov, and Z. A. Tsukerman (Elektroprovodnost' produktov vzry*va kondensirovanny*kh VV. Zh. experim. i teor. fiz., 1959, t. 37. No. 6(12), 1543) and A. N. Dremin, K. K. Shvedov, and V. A. Veretennikov (Issledovaniye detonatsii ammonita PZhV-20 i nekotory*kh drugikh VV. Sb. Vzry*vnoye delo, 1963, No. 52/9). This method exploited the phenomenon of electromagnetic induction for those measurements. Aluminum foils were used for conductors with a thickness of 0.1 mm and a width of 12 to 15 mm, and were bent to form a horseshoe. The experiment

Card 1/3

ACCESSION NR: AP4034282

was conducted at a constant magnetic field of 400 oersteds (±1.5%) created by stationary electromagnets. As the detonation wave passed by the charge, the crossbar of a data unit moved with the mass velocity perpendicular to the magnetic field. The emf from the ends of the data unit was recorded by an oscillograph. It was assumed that the presence of the data unit in the explosive did not distort the profile of the detonation wave. An abrupt rise followed by a smooth drop in the mass velocity was observed from the oscillogram taken in inert media. For checking this work, the velocity in front of the detonation wave was measured for trotyl at various densities for which data had been obtained earlier by different methods. The magnitudes of the velocity u, reaction time τ, speed of detonation D, the pressure in the Chapman-Jouguet region p, the index of polytropy n, and the thickness of the reaction zone a are related by the formula

$p = \rho_0 u_1 D, \quad n = D/u_1 - 1, \quad a = (D - \langle u \rangle)\tau$, where $\langle \overline{u} \rangle$ is the average velocity of motion of the substances in the chemical regime. The results obtained in this work were compared with those of V. M. Zaytsov, P. F. Pokhil and K. K. Shchvedov (Elektromagnitny*y metod izmereniya skorosti produktov vzry*va. Dokl. AN SSSR, 1960, t. 132, No. 6.). It was found that the values obtained for u and p in the present work were somewhat smaller than those obtained in the above reference. Orig. art. has: 1 formula, 3 figures, and 1 table.

Card 2/3

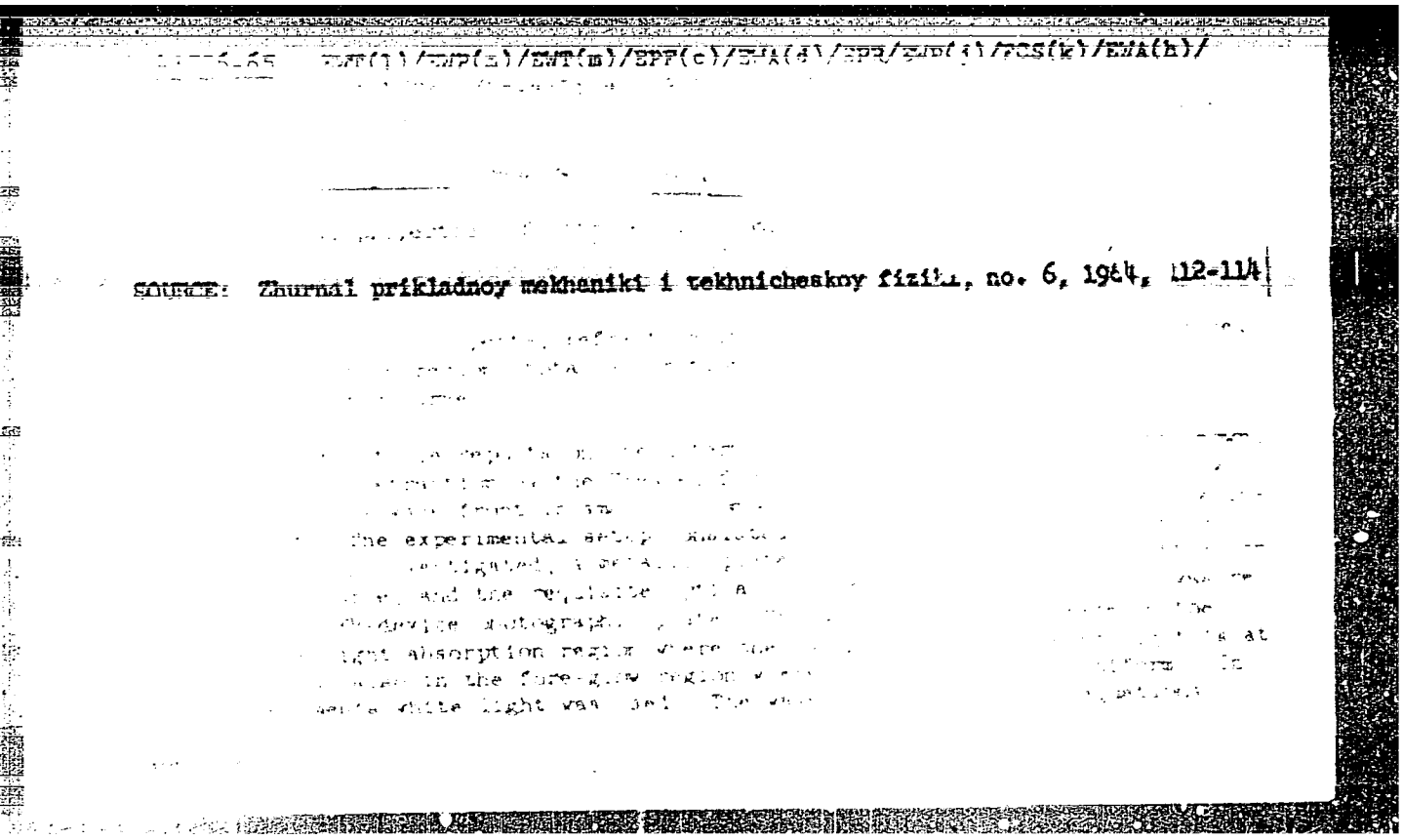
ACCESSION NR: AP4034282

ASSOCIATION: none

SUBMITTED: 28Dec63 ENCL: 00

SUB CODE: WA NO REF SOV: 008 OTHER: 007

Card 3/3



EWT(l)/EWP(e)/EWT(m)/EPF(c)/EWA(d)/EPR/EWP(t)/ETC(k)/EWA(h)/

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 6, 1964, 112-114

velocity. The authors thank G.G. Nemtsev, V. A. Pa[illegible] for their help in carrying out the experiments." Orig. art. has: 5 figures and 6

ADADUROV, G.A. (Moskva); DREMIN, A.N. (Moskva); RYABININ, Yu.N. (Moskva)

Behavior of certain substances under shock wave compression.
PMTF no.6:115-119 N-D '64 (MIRA 18:2)

DREMIN, A.N.; ROZANOV, O.K.

Measurement of shock-wave adiabats for mixtures of nitromethane with acetone. Izv. AN SSSR. Ser. khim. no.8: 1513-1514 Ag '64. (MIRA 17:9)

1. Institut khimicheskoy fiziki AN SSSR.

ACCESSION NR: AP4039665 S/0181/64/006/006/1757/1764

AUTHORS: Dremin, A. N.; Adadurov, G. A.

TITLE: The behavior of glass during dynamic loading

SOURCE: Fizika tverdogo tela, v. 6, no. 6, 1964, 1757-1764

TOPIC TAGS: dynamic load, compressive property, glass, shock wave, wave front/ OK 17 oscillograph

ABSTRACT: The authors studied the behavior of glass during dynamic compression, using electromagnetic methods of measurement. Profiles of the mass velocity were obtained in front of shock waves generated in the glass at various pressures by the reflection of various detonation waves from a deflector. The shock speed was measured over a length of 4-8 mm. In all the experiments the ratio of the width of the specimen to its thickness was greater than 3. The electromagnetic method of measurement is described by L. V. Al'tshuler, K. K. Krupnikov, and M. I. Brazhnik (ZhETF, 34, 886, 1958) and A. N. Dremin and G. A. Adadurov (DAN SSSR, 128, 261, 1959). A constant magnetic field of 360 oersteds was used for these measurements. The emf was recorded by a double impulse cathode oscillograph of the type OK-17 with a passage frequency along both channels of 10 megacycles. The

Card 1/2

ACCESSION NR: AP4039665

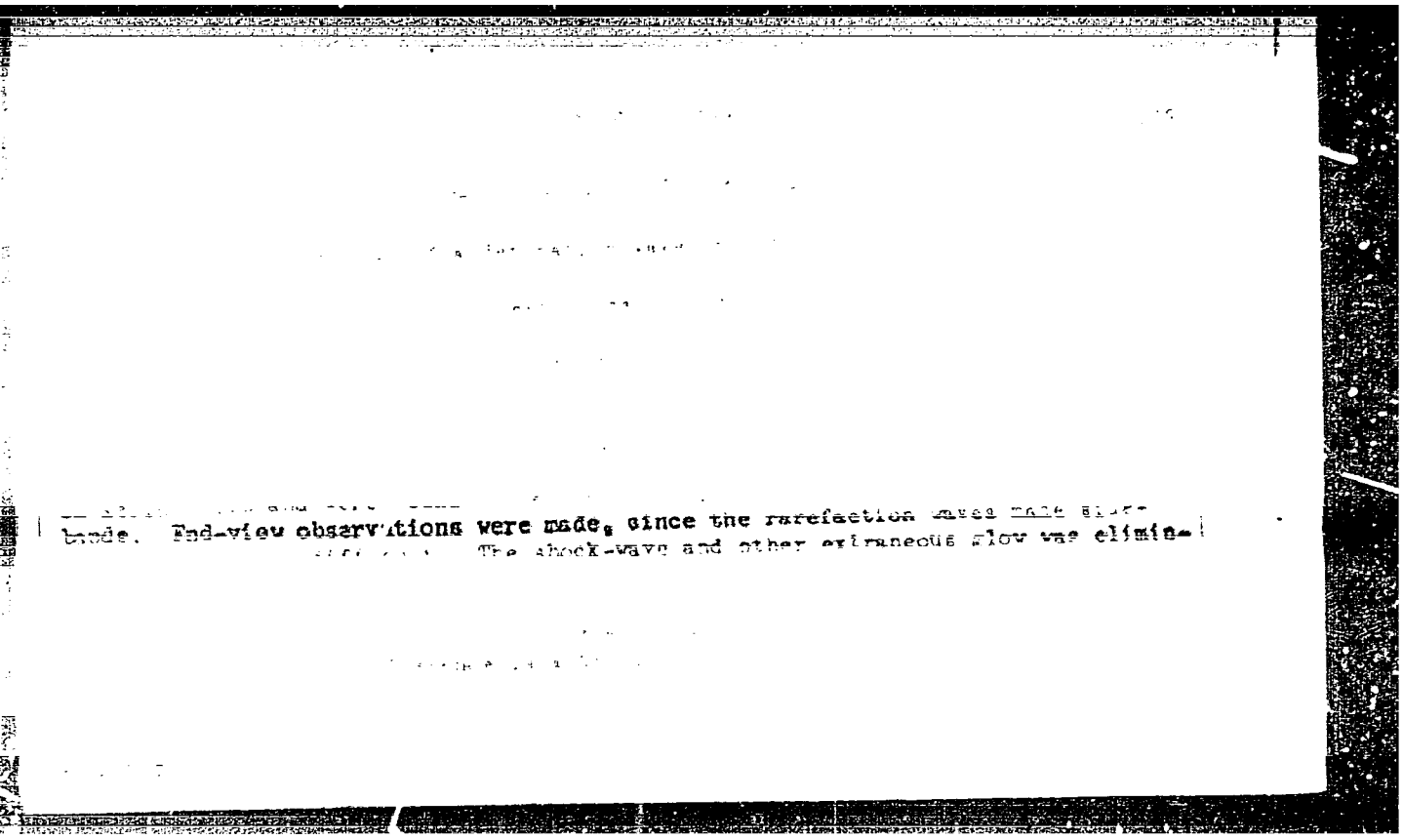
steep front in the oscillogram did not exceed 0.1 microsec to a precision of 3%. Experiments on a glass having a percentage composition of SiO_2 - 72.2, CaO - 12.4, Na_2O - 14.1, Al_2O_3 - 0.5, SO_3 - 0.43, MgO - 0.1, and Fe_2O_3 - 0.06, and a density of 2.48 g/cm^3 showed the following results: 1) the shock speed was 5.40 km/sec, and the wave profiles revealed that at low pressures only one wave was present; 2) with increasing pressure a double wave configuration appeared, and the amplitude of the first wave had a mild tendency to decrease. The second wave did not have a sharp front at first, but beginning with a certain pressure, its front started to turn; 3) between these two waves there was a region in which there was a buildup of the mass velocity. In these experiments the pressure at the paraffin deflector was 10.3×10^{10} bar. Using these results, the authors plotted a P-V diagram for glass during compression. The authors thank F. F. Vitman for furnishing the glass specimens for these experiments, V. S. Trofimov for the useful discussions, and V. Ye. Chemagin for helping with the experiments. Orig. art. has: 7 figures and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki, AN SSSR, Moscow (Institute of Chemical Physics, AN SSSR)

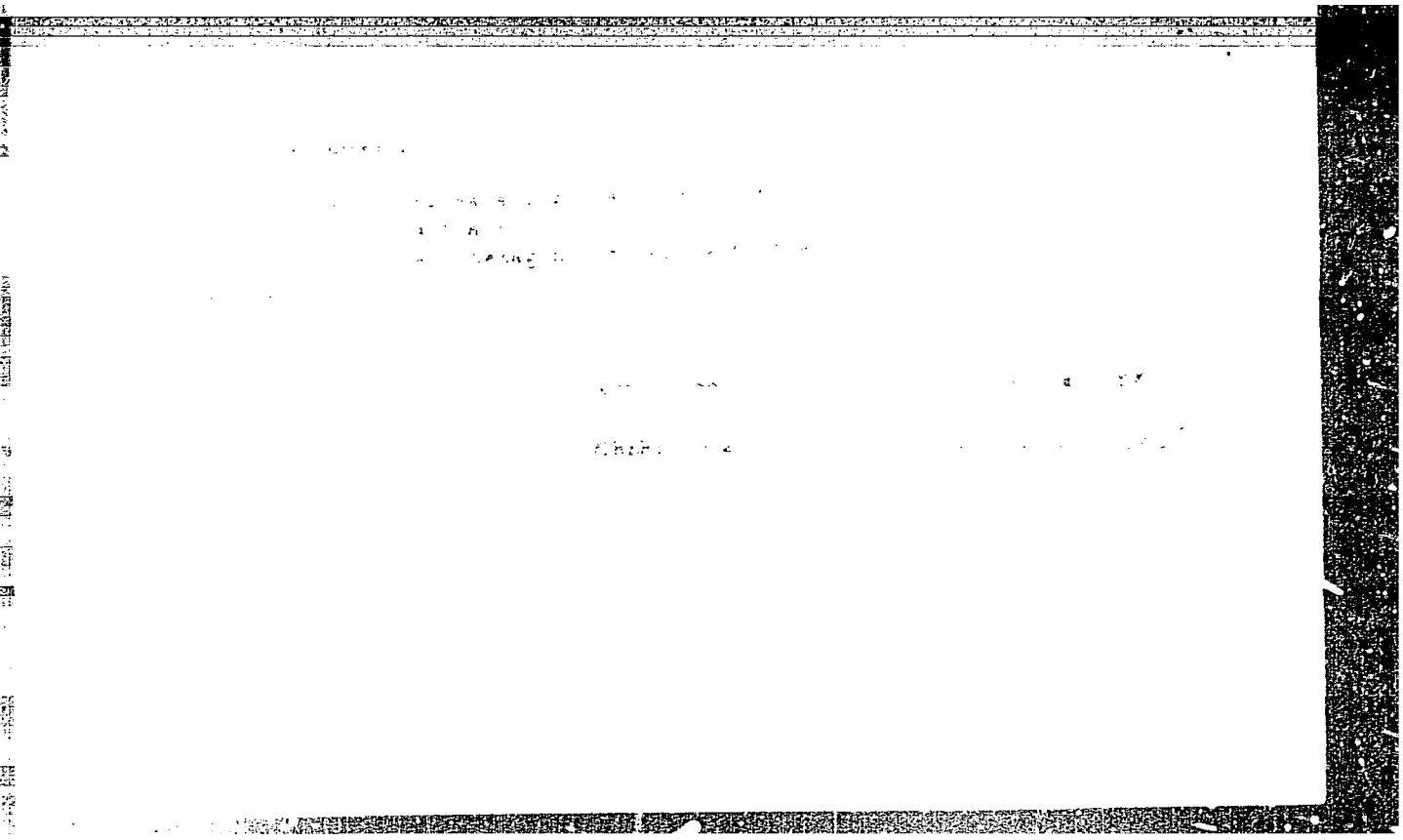
SUBMITTED: 07Jan64 ENCL: 00

SUB CODE: ME NO REF SOV: 008 OTHER: 004

Card 2/2



blade. End-view observations were made, since the rarefaction waves made slant
The shock-wave and other extraneous flow was elimin-

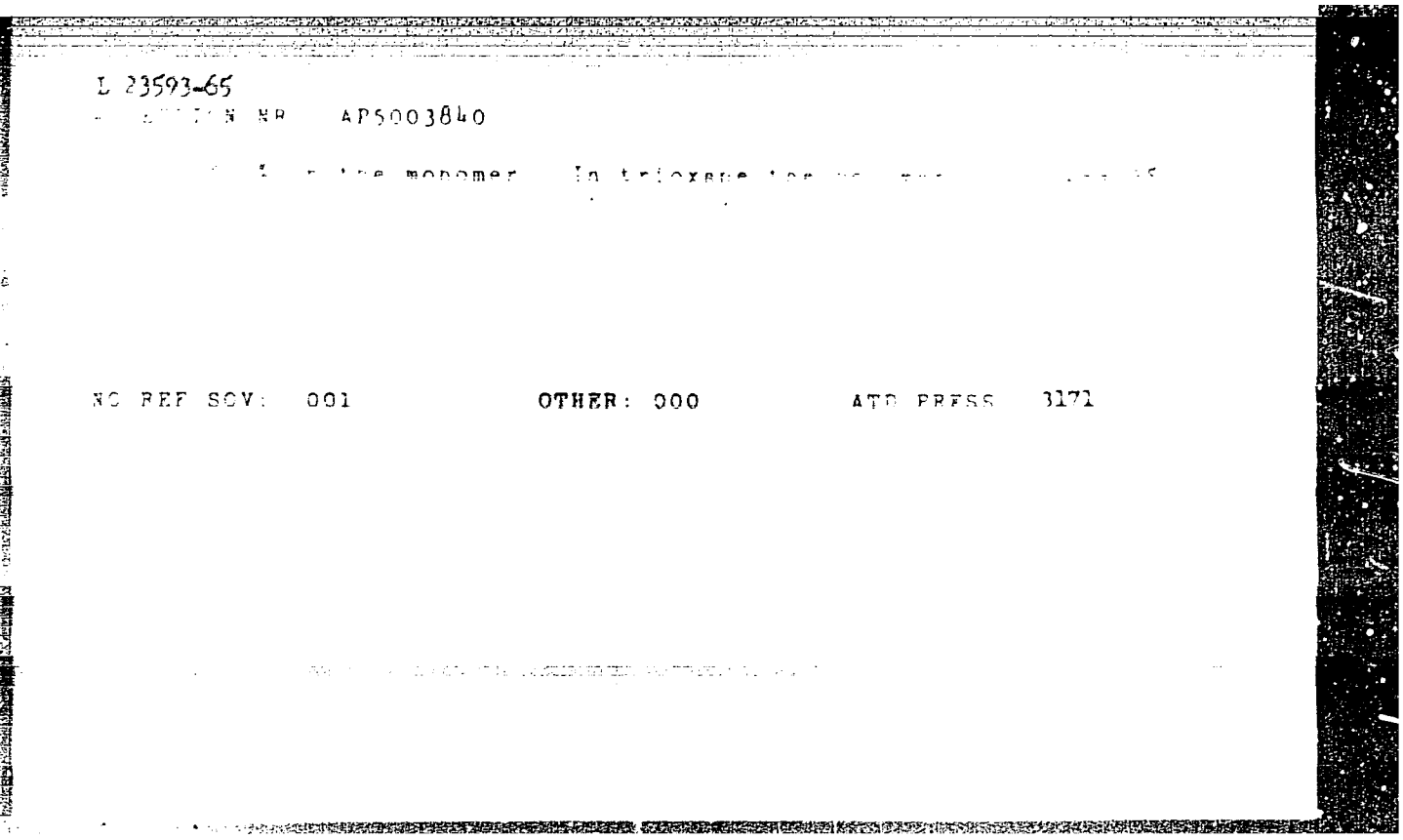


APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00041121(

L 23593-65 EWT(m)/EPF(c)/EWP(j)/T Pc-4/Pr-4 RM

TOPIC TAGS: polymerization, shock wave, methacrylamide, trioxane, polyoxymethylene

atm abs produced by the explosion of trotyl-nexogen. The temperature



L 23593-65

ACCESSION NR AP5003840

[illegible] monomer [illegible]

NO REF SOV: 001 OTHER: 000 ATD PRESS 3171

L 9554-66 EWT(l)/EWP(m)/EWT(m)/EWA(d)/EWP(j)/T/ECS(k)/EWA(h)/EWA(c) RPL
ACC NR: AP5026061 WW/JW/WE/RM SOURCE CODE: UR/0405/65/000/002/0003/0011

AUTHOR: Dremin, A. N. (Moscow); Savrov, S. D. (Moscow); Andriyevskiy, A. N. (Moscow)

ORG: none

TITLE: Initiation of nitromethane detonation by a shock wave

SOURCE: Nauchno-tekhnicheskiye problemy goreniya i vzryva, no. 2, 1965, 3-11

TOPIC TAGS: detonation theory, high speed detonation, shock wave detonation, nitromethane, mass velocity profile, detonation wave velocity, shock wave, high speed photography, explosive

ABSTRACT: Previous studies of high-speed phenomena in shock wave detonations of explosives are discussed. To obtain data for calculating the pressure developed in a high-speed detonation wave in a nitromethane charge, an improved version of the previously described electromagnetic method for registering mass velocity profiles (A. N. Dremin, K. K. Shvedov, V. A. Veretennikov. Sb. "Vzryvnoye delo", Gosgortekhizdat, 1963, No. 52/9) was used. To maintain a constant initiation delay time of 2—3 μsec, charges with constant parameters were used in all cases. The mass velocity in the initiating shock wave was 1.6 km/sec at a distance of 5 mm from the partition and 1.55 km/sec at a distance of 10 mm. The additional mass velocity behind the ultrasonic detonation wave was 1.2 km/sec. The reaction zone behind the detonation wave was probably very narrow, since it did not register on the oscillograms. The wave velocities in the high-speed detonation were studied by high-speed photography. Using

Card 1/2 UDC: 532.593+534.222.2

L 9554-66
ACC NR: AP5026061

the photograms obtained and the time-distance diagram, the detonation wave velocity in the nitromethane compressed by a shock wave at 72000—77000 atm was calculated to be 9.0 ± 0.5 km/sec. The detonation wave velocity obtained by the method of direct observation of the wave propagation, with high-speed photography and a small hexogen charge to initiate the detonation at the moment when the shock wave enters the charge, yielded a lower value for the detonation wave velocity (8.1 ± 0.1 km/sec) than the previous method, based on the mass velocity measurements. The experimental mass velocity and detonation wave velocity values were used to calculate the high-speed detonation pressure (250000 atm) in the nitromethane compressed by a shock wave and the pressure in the initiating shock wave (77000 atm). Experiments with the initiation of nitromethane detonation by a weak shock wave (70000 atm) showed the absence of high-speed detonation. Experiments with the detonation of nitromethane charges compressed by a shock wave by the collision of a shock and a detonation wave showed a delay in the appearance of the "preglow" phenomena which propagate in the compressed charge at velocities up to 40 km/sec. Orig. art. has: 10 figures. [PS]

SUB CODE: 19/20/ SUBM DATE: 09Jan65/ ORIG REF: 004/ OTH REF: 006/ ATD PRESS: 4150

Card 2/2

L 4985-66 EPA/EPA(s)-2/EWT(m)/EPF(c)/EWP(j)/T/EWA(c) RPL WW/JW/JWD/WE/RM

ACC NR: AP5026071 SOURCE CODE: UR/0405/65/000/002/0093/0100

AUTHOR: Dremin, A. N. (Moscow); Rozanov, O. K. (Moscow)

ORG: none

TITLE: Analogy of detonations of gaseous and liquid explosives

SOURCE: Nauchno-tekhnicheskiye problemy goreniya i vzryva, no. 2, 1965, 93-100

TOPIC TAGS: combustion, explosive, detonation, detonation wave, explosion, liquid explosive

ABSTRACT: The propagation of detonation waves in liquid and gaseous explosives is similar in that the detonation speed is almost independent of the charge diameter; the detonation wave is attenuated when passing from a narrow cylindrical tube into a tube or vessel of larger diameter, or when it passes from a cylindrical into a divergent tube section. In the latter case, the attenuation of the wave depends on the cone angle and tube diameter. In the present article, the transition of a detonation wave in an acetylene-oxygen mixture from a 50-mm into a 120-mm-diameter tube and in a nitromethane-acetone mixture from an 88-mm-diameter into a 180-mm diameter vessel was studied by high-speed photography. The distances between the luminous bands, which were taken as the average size of the detonation wave inhomogeneities, were plotted on the basis of previous experiments as functions of initial gas pressure (for a hydrogen-oxygen mixture), the amount of inert additives in a nitromethane-acetone

Card 1/2 UDC: 534.222.2+532.593

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L 4983-66
ACC NR: AP5026071

mixture, and the diameter of the nitromethane-acetone charge. On the basis of the experimental findings, a unifying theory is proposed which predicts that a spinning detonation in liquid explosives is possible when the mixture is sufficiently diluted so that the size of the inhomogeneity is of the same order of magnitude as the tube diameter. The results indicate that the mechanisms underlying the propagation of detonations in liquids, gases, and in single crystals are identical. Orig. art. has: 4 figures. [PV]

SUB CODE: MM,FP/ SUBM DATE: 02Feb65/ ORIG REF: 021/ OTH REF: 006/ ATD PRESS: 4131

Card 2/2

L 14220-66 EWT(1)/EWT(m)/EWP(j)/FCS(k)/FSS-2 RM/WW/JW/JWD

ACC NR: AP6004424 SOURCE CODE: UR/0414/65/000/003/0003/0009

AUTHOR: Veretennikov, V. A. (Moscow); Dremin, A. N. (Moscow); Shvedov, K. K. (Moscow)

ORG: none

44

B

TITLE: Determination of the detonation parameters of condensed explosives

SOURCE: Fizika goreniya i vzryva, no. 3, 1965, 3-9

TOPIC TAGS: condensed explosive, detonation velocity, detonation pressure

ABSTRACT: To determine the effect of the explosive density ρ and charge diameter d on the detonation parameters of condensed explosives, the detonation velocity D, mass velocity u_1, pressure p_1, reaction time τ, and the width of the reaction zone a were measured in charges of trinitrotoluene (TNT) with ρ = 0.8—1.59 g/cm^3, d = 22.5—600 mm, and the charge length-diameter ratio h/d = 2.25—9.75. In TNT charges with ρ = 1.59 g/cm^3 and d = 60 mm, an h/d ratio above 2.25 has no effect on the detonation parameters. A comparison of pressure and reaction time data obtained for TNT charges by different methods showed that while for TNT charges with d = 100 mm and ρ = 0.8 g/cm^3, the reaction time measured by the electromagnetic method was 0.68 μsec at p_1 = 41,700 atm, for charges of the same density and d = 200 mm, τ was 0.23 μsec at p = 51,900 atm., when measured by the propelled plate method. This considerable decrease in the reaction time cannot be attributed to the pressure increase. Therefore, it is suggested that the decrease in the reaction time measured by the propelled metal

Card 1/2 UDC: 534.222.2

L 11220-66

ACC NR: AP6004424

plate method is due to the effect of a reflected shock wave on the explosive-metal plate interface, and this must be taken into account. The reaction time decreased as the pressure in the reaction zone increased. The effect of the reflected wave decreased as the initial densities of the explosives increased. In this case, similar results are obtained by both methods. The use of thin metal plates also decreases the effect of the reflected shock wave on the pressure in the reaction zone, and, consequently, on the reaction time. The mass velocity profile for the detonation wave of condensed explosives has a clearly defined peak, which was predicted by the hydrodynamic theory (Ya. B. Zel'dovich, ZhETF, 1940, 10, 542). It can be identified with the chemical reaction zone. Analysis of the curves of the relationship $a = a(1/d)$ showed that even when $d = \infty$, a and τ are finite. Orig. art. has: 4 tables and 6 figures.

[PS]

SUB CODE: 19/ SUBM DATE: 15Jan65/ ORIG REF: 009/ OTH REF: 002/ ATD PRESS: 4195

Card 2/2

ACC NR: AP5004437 SOURCE CODE: UR/0414/65/000/003/0093/0098

AUTHOR: Dremin, A. N. (Moscow); Rozanov, O. K. (Moscow); Koba, I. G. (Moscow) 52

ORG: none B

TITLE: Study of the reaction time in the detonation of liquid explosives by the electromagnetic method 21,44,55

SOURCE: Fizika goreniya i vzryva, no. 3, 1965, 93-98

TOPIC TAGS: liquid explosive, detonation time

ABSTRACT: The reaction time τ in the detonation of liquid explosives 54.55 was studied by obtaining mass velocity profiles for charges of nitromethane and of a nitromethane-acetone mixture (75:25) using the previously described electromagnetic method (A. N. Dremin, K. K. Shvedov. PMTF, 1964, 2). To determine the effect of the size of the recording wire, which is located within the explosive charge in the electromagnetic method, the interaction of a detonation wave with a plate of aluminum foil (0.035 mm thick) and with a mica plate (0.04 mm thick) in nitromethane and nitromethane-acetone mixtures was studied using high-speed photography. It is shown that there is a detonation delay of about 0.15 μsec behind both the aluminum and the mica plates. The mass velocity profiles recorded by the electromagnetic method with wires 0.035 and 0.22 mm thick for nitromethane and nitromethane-acetone mixtures also showed a detonation delay of about 0.17 μsec in the case of the 0.035 mm wire, which is in good

Card 1/2

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L 14009-66

ACC NR: AP6004437

agreement with the value obtained by the photographic measurements. With the 0.22 mm recording wire, the detonation delay was 0.45 μsec. This difference is probably due to the difference in the intensities of the shock waves leaving the wires. The mass velocity in the snock wave behind the thin wire is greater than behind the thick wire. Thus, the recording wire creates a discontinuity dividing the combustion products and the unperturbed explosive. The mass velocity in the unperturbed explosive behind the shock wave may be calculated from the mass velocity of the combustion products and the shock adiabat of the explosive. The calculated value of the mass velocity behind the shock wave (u_1 = 1.86 km/sec) is close to the value obtained from the electromagnetically recorded mass velocity profile (u_1 = 1.82 km/sec). Extrapolated to the initial mass velocity recording point, u_1 = 2.04 km/sec. The mass velocity sharply decreased from the initial maximum point to a certain break point after which the decrease became steady. The mass velocity at the break point was u_2 = 1.51 km/sec. The time from the initial recording point to the sharp break point is the total reaction time τ_* and estimated to be equal to about 0.4 sec for the nitromethane-acetone mixture. The width of the reaction zone may be calculated when τ_* is known: $a = \tau_*(D-\bar{u})$, where D is the detonation velocity and $\bar{u}$ is the average mass velocity. For the nitromethane-acetone mixture (75:25), D = 5.75 km/sec and $\bar{u}$ = 1.77 km/sec; thus a = 1.6 mm. Orig. art. has: 4 figures and 1 formula. [PS]

SUB CODE: 19/ SUBM DATE: 02Feb65/ ORIG REF: 014/ OTH REF: 005/ ATD PRESS: 4196

Card 2/2

L 26500-66 EWP(m)/EPF(n)-2/EWA(h)/EWT(1)/EWT(m)/EWA(d) MW/JD/JG

ACC NR: AP6011499 SOURCE CODE: UR/0414/65/000/004/0003/0009

AUTHOR: Dremin, A. N. (Moscow); Pershin, S. V. (Moscow); Pogorelov, V. F. (Moscow)

ORG: none

TITLE: Structure of shock waves in KCl and KBr under dynamic compression to 200,000 atm.

SOURCE: Fizika goreniya i vzryva, no. 4, 1965, 3-9

TOPIC TAGS: potassium chloride, potassium bromide, shock wave structure, compression shock wave, shock wave velocity, phase transition

ABSTRACT: To compare the dynamic compressibility of KCl and KBr with the static compressibility and to obtain additional data on the kinetics of the phase transformation under shock compression, the authors measured the shock adiabat of the substances by an electromagnetic method for measuring the mass velocity of the material behind the front of the shock wave, developed by Ye. K. Zavoyskiy in 1948 (V. M. Zaytsev et al., Dokl. AN SSSR, 1960, v. 132, 1339). In this method the velocity is determined by the voltage induced in a thin aluminum foil moving with the substance and crossing flux lines of an external magnetic field. Most experiments were carried out at pressures of 37.5×10^9 bar in the case of KCl and 45.0×10^9 bar in the case of KBr. The procedure for plotting the velocity diagrams is briefly described. The shock wave velocity was found to be 3.20 ± 0.02 km/sec for KCl and 2.79 ± 0.02 km/sec for KBr. The corresponding mass velocities

Card 1/2 UDC: 532.593

ACC NR: AP6011499 0

0.31 ± 0.01 for both substances. The results show that at the point of polymorphic transformation the compressibility parameters obtained under static and dynamic conditions are nearly the same, indicating that the transformation does not depend on the length of time during which the required pressure is applied. It is deduced from the slope of the second shock wave that the phase transformation occurs very rapidly, within not more than 0.2 μsec at pressures on the order of 40×10^9 bar. Orig. art. has: 8 figures, 1 formula, and 2 tables.

SUB CODE: 20/ SUBM DATE: 24Feb65/ ORIG REF: 005/ OTH REF: 001

L 17629-66 EWT(m)/EWP(j)/T/EWP(k) RM

ACC NR: AP6001732 SOURCE CODE: UR/0020/65/165/004/0851/0854

AUTHORS: Adadurov, G. A.; Barkalov, I. M.; Dremin, A. N.; Ignatovich, T. N.; Mikhaylov, A. N.; Tal'roze, V. L.; Yampol'skiy, P. A.; Gol'danskiy, V. I. (Corresponding member AN SSSR)

ORG: Institute for Chemical Physics, Academy of Sciences, SSSR (Institute khimicheskoy fiziki Akademii nauk SSSR)

76
B

TITLE: Polymerization of condensed monomers in shock waves 7,44,55

SOURCE: AN SSSR. Doklady, v. 165, no. 4, 1965, 851-854

TOPIC TAGS: polymerization, shock wave, monomer

ABSTRACT: The shock wave polymerization of condensed monomers (trioxane, acrylamide, potassium acrylate, methacrylamide, tolane, salicilic aldehyde, stilbene, and diphenylbutadiene) was studied. The experimental technique followed that described by G. A. Adadurov i dr. (Vysokomolek. soyed., 7 No. 1, 180, 1965). The experimental results are tabulated. It is concluded that observed polymer-

Card 1/2 UDC: 541.64; 678.744; 534.222.1

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L 17629-66
ACC NR: AP6001732

ization occurs directly in the shock wave and is not due to secondary effects. Orig. art. has: 1 table.

SUB CODE: 11/ SUBM DATE: 01Jun65/ ORIG REF: 008/ OTH REF: 005

Card 2/2

ACC NR: AP6020551 SOURCE CODE: UR/0414/66/000/001/0036/0046

AUTHOR: Dremin, A. N. (Moscow); Savrov, S. D. (Moscow)

ORG: none

55
B

TITLE: Stability of the detonation front in liquid explosives

SOURCE: Fizika goreniya i vzryva, no. 1, 1966, 36-46

TOPIC TAGS: detonation stability, liquid explosive, nitromethane, nitrate, ~~tetranitromethane, dinitroglycerine, trinitroglycerine, detonation, liquid detonation~~

ABSTRACT: The stability of the detonation front in liquid explosives (nitromethane, glycidyl nitrate, HNO_3+ dichloroethane, tetranitromethane, and di- and trinitroglycerine) was studied experimentally using the light reflection method, in which an image of a bright object (a light source with a diaphragm) on the surface of the detonation front is photographed. The results showed that under normal detonation conditions, the detonation front in nitromethane and in glycidyl nitrate is unstable. Under overcompression, when the detonation is initiated by a high-density hexogen charge, the detonation front in nitromethane is stable. Under normal detonation conditions stable detonation fronts were observed in tetranitromethane and di- and trinitroglycerine. Measurement of the mass velocity in the reaction zone in tetranitromethane indicated the absence of a clearly defined induction period. The

 UDC: 534.222.2

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experimental results are explained by mechanisms involving the chemical reactions behind the detonation front and the development of thermal explosions. Orig. art. has: 10 figures. [PS]

SUB CODE: 19/ SUBM DATE: 16Sep65/ ORIG REF: 016/ OTH REF: 001/ ATD PRESS: 5021

Card 2/2

L 34041-66 EWT(1)/EWP(m)/EWT(m)/EWP(j) IJP(c) WW/RM

ACC NR: AP6012921 SOURCE CODE: UR/0020/66/167/005/1077/1078

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AUTHOR: Barkalov, I.M.; Gol'danskiy, V.I. (Corresponding member AN SSSR); Gustov, V.V.; Dremin, A.N.; Mikhaylov, A.M.; Tal'roze, V.L.; Yampol'skiy, P.A.

ORG: Institute of Chemical Physics, Academy of Sciences, SSSR (Institut khimicheskoy fiziki Akademii nauk SSSR)

TITLE: Shock wave vulcanization of rubbers

SOURCE: AN SSSR. Doklady, v. 167, no. 5, 1966, 1077-1078

TOPIC TAGS: vulcanization, rubber, shock wave

ABSTRACT: Continuing the study of polymerization in shock waves, the authors investigated the possibility of vulcanizing rubbers by use of a shock wave. Samples of NK, SKB, "yuropren"-1500, SKS-30A, SKD, and polyisobutylene rubbers were subjected to shock waves with amplitudes from 30,000 to 100,000 atm. The percentage of the gel fraction and the molecular weight of the network were determined in each sample. No cross-linking could be detected in polyisobutylene (a rubber having no double bonds in the macromolecule); only a certain degree of degradation took place. The shock-wave-induced cross-linking reaction in SKB rubber has a definite threshold character, the threshold pressure being about 35,000 atm. The gel fraction appears above this pressure, and at 80,000 atm an almost completely cross-linked vulcanization is obtained. A partial calcination is observed above 100,000 atm. The vulcanization phenomena observed occur at the instant the shock

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Card 1/2

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wave passes through the rubber, i.e., in a time of the order of 10^{-5} sec. Thus, in SKB rubber (MW 80,000 — 200,000) at a pressure of 50,000 atm in the shock wave, over 10^{19} cross-links are formed per gram in 10^{-5} sec. Orig. art. has: 1 figure and 1 table.

SUB CODE: 11,07 / SUBM DATE: 16Nov65 / ORIG REF: 003 / OTH REF: 001

Card 2/2

ACC NR: AP7000638 SOURCE CODE: UR/0414/66/000/003/0019/0030

AUTHOR: Trofimov, V. S. (Moscow); Dremin, A. N. (Moscow)

ORG: none

TITLE: On the fundamentals of a selection law for detonation velocity

SOURCE: Fizika goreniya i vzryva, no. 3, 1966, 19-30

TOPIC TAGS: detonation velocity, detonation kinetics, detonation wave, detonation rate

ABSTRACT: A new method for treating the explosion dynamics characterized by turbulence in the detonation front is presented. The turbulence is described by means of auxiliary averaging functions. When the averaging functions are purely thermodynamic, an additional distribution function is utilized. The laws of conservation are written in terms of these functions and it is shown that the dynamics are analogous to that of a plane detonation wave. The general problem yields physically interesting results when it is assumed that turbulence changes sufficiently rapidly into an isotropic process and fluctuations of the thermodynamic quantities damp out faster than velocity fluctuations. These assumptions lead to the computation of reaction rates which show that, in a regime approaching equilibrium, chemical reactions decay slower or faster according to certain heat flow criteria. This approach also explains theoretically

UDC: 534.222.2

ACC NR: AP7000638

acoustic radiation in a direction toward the explosion products that was observed by P. I. Soloykhin (*Nauchno-tekhnicheskiye problemy goreniya i rezryva*, 1965, 2, 35). Orig. art. has: 38 formulas.

SUB CODE: 19,07/ SUBM DATE: 02Mar66/ ORIG REF: 012/ OTH REF: 004

Card 2/2